

## CURRICULUM VITAE

### NITISH V. THAKOR, Ph.D.

Dept. of Biomedical Engineering  
Johns Hopkins School of Medicine  
Baltimore, MD 21205, USA  
e-mail: [nthakor@bme.jhu.edu](mailto:nthakor@bme.jhu.edu)  
Tel: 443-336-8500(Mobile), 955-0077 (Lab)  
<http://neuroengineering.bme.jhu.edu>

Dept. of Biomedical Engineering  
National University of Singapore  
Singapore  
e-mail: [eletnv@nus.edu.sg](mailto:eletnv@nus.edu.sg)  
Tel: +65-66012658

### ACADEMIC RECORD

1969-1974	B.S.	Electrical Engineering	Indian Institute of Technology, Bombay
1977-1978	M.S.	Biomedical Engineering	University of Wisconsin, Madison
1979-1981	Ph.D.	Electrical and Computer Eng.	University of Wisconsin, Madison

### EXPERIENCE

1974-1976	Electronics Engineer	Philips Company (India)
1977-1981	Teaching & Research Asst.	University of Wisconsin, Madison
1981-1983	Assistant Professor Electrical Eng. & Computer Science	Northwestern University, Evanston
1984-1986	Assistant Professor Biomedical Engineering	The Johns Hopkins University School of Medicine
1987-1994	Associate Professor Biomedical Engineering	The Johns Hopkins University School of Medicine
1994- present	Professor Biomedical Engineering	The Johns Hopkins University School of Medicine
2012-present	Provost Chair Professor Professor, Electrical and Computer Engineering, Biomedical Engineering, Medicine	National University of Singapore

### TEACHING ACTIVITIES

1981-1983	Computers in Biomedical Engineering, Real-time computer systems, Microprocessor Software Design
1984-present	Principles of Design of Biomedical Instrumentation, Advanced Biomedical Instrumentation, Biomedical Sensors, Economic Health Care Technologies, Neuroengineering Continuing education courses on Microcomputer-based Medical Instrumentation and Biomedical Laboratory Computing, Neuroengineering, Molecular and Cellular Instrumentation
2012-2018	Director, Singapore Institute of Neurotechnology (SINAPSE), Singapore
Present	Distinguished Honorary Professor, Indian Institute of Technology, Gandhinagar, India Visiting Professor, Med-X, Shanghai Jiao Tong University

### AWARDS

- National Scholarship, India; Graduate Fellowships, University of Wisconsin, Madison
- 2nd Prize, Student Paper Competition, Annu. Conf. Eng. Med. Biol. (1981)
- 1st Prize, Paper Competition, Symp. Computer Appl. Med. Care (1982)
- Research Career Development Award, The National Institutes of Health (1985-1990)
- The Presidential Young Investigator Award, The National Science Foundation (1985-1991)
- The Fulbright Fellowship, Cybernetics Institute, Barcelona, Spain, 1987.
- Centennial Achievement Medal - University of Wisconsin, School of Engineering, 1993.
- Fellow, American Institute of Medical and Biological Engineering, 1996; Fellow, Institute of Electrical and Electronics Engineers (IEEE) 1997, Founding Fellow, Biomedical Engineering Society, 2005.
- Distinguished Service Award, Indian Institute of Technology, Bombay, India, 2008 and Distinguished Alumnus Award, Indian Institute of Technology, Bombay, India, 2010.

- Technical Achievement Award from IEEE Engineering in Medicine and Biology Society, 2010.
- Distinguished Achievement Award, University of Wisconsin, School of Engineering, Madison, WI, 2010.
- Fellow, International Academy of Medical and Biological Engineering, International Federation of Medical and Biological Engineering, 2012.
- Editor in Chief, IEEE Transactions on Neural Systems and Rehabilitation Engineering (2005-2011) and Medical and Biological Engineering and Computing (2013-present).
- Engineering Leadership Award, National University of Singapore, 2016.
- IEEE Engineering in Medicine and Biology Society, Academic Career Leadership Award, 2017

## **RESEARCH FOCUS AND VISION**

Basic and translational research on Medical Instrumentation with focus on Neurotechnology.

### Mission:

- To sustain an internationally recognized basic research program on basic and clinical neuroscience research on the mechanism and therapy of brain diseases and disorders.
- To develop a nationally recognized program for technology development and commercialization of medical instrumentation and technology with a focus on Neuroengineering, Implantable technologies, and Prosthesis.
- Develop innovative micro and nanotechnologies and prosthetic devices for medical research and clinical applications, especially in the area of neurosciences.
- To develop economic medical and health care technology for global health.
- To develop innovative technologies and promote their commercialization through University-industry partnerships and spinoffs
- To educate students and post-doctoral scientists for careers in academia and industry and to foster a vibrant academic-industry relationship.
- To create an innovative educational frame-work through innovative new curricula, emphasis on design in undergraduate curriculum, and to provide professional/continuing training
- Publications, presentations, and organizational leadership at national and international conferences and symposia.
- To foster research collaboration and education at the international level.

## **PROFESSIONAL ACTIVITIES**

- Fellow, IEEE; Fellow; AIMBE; Founding Fellow, Biomed. Eng. Soc.; Sigma Xi
- Associate Editor, IEEE Transactions on Biomedical Engineering (1989-2002), IEEE Transactions on Information Technology (1996-2002), J. Ambulatory Monitoring (1988-1994), J. Biological Systems (1992-1996), Annals of Biomedical Engineering (1999-2005); Nanobiotechnology (2005-2008), Biomedical Microdevices and Nanotechnology (2008-present), Editorial Board, Frontiers of Neuroengineering (2009-present), International Journal of Neural Systems and Engineering (2010-present).
- Editor-in-Chief, IEEE Transactions on Neural and Rehabilitation Engineering, 2006-2011; Scientific Advisory Board, 2012. Editorial Advisory Board, IEEE T-BME (2002-present).
- Editor-in-Chief, Medical and Biological Engineering and Computing, 2012-present.
- Co-Founder and Chief Scientific Officer, Infinite Biomedical Technologies, Baltimore, MD, developer of neurological monitoring technologies for Neuroscience Critical Care and Neurosurgery: raised more than \$20 Million from 1997-present.
- Co-Founder and Member of the Board, Ikona Medical, CA; developer of endoscopic imaging technology; raised more than \$1 Million in funding through SBIR funding
- Co-Founder and Member of the Board, Vigilant Medical, Baltimore, MD; currently marketing Image and File Share technologies
- Co-Founder and Member of the Board, Vasoptic Medical, Baltimore, MD; currently developing a portable retinal imager for early onset of diabetes
- Reviewer, IEEE Trans. Biomed. Eng., IEEE Trans. Signal Processing, Med. Biol. Eng. Comput., J. Appl. Physiol., J. Electroenceph. Clin. Neurophysiol., J. Cardiac Electrophysiol., Circ. Res., PACE, J. Neurosci. Methods, Brain Res., J. Neurophysiol. IEEE Trans. Biomed. Circuits and Systems, etc.
- Member of numerous Special Study Sections and Small Business Grants Study Sections, NIH and NSF; 1985-present; member of several NIH Training Grant study sections

- Member, NIH Site Visits; Frequent reviewer for the NSF, Whitaker Foundation and the NIH; 1985-present
- Permanent Member (1995-99) Surgery & Bioengineering Study Section, NIH; Review panel, NIDRR, 1998; VA Merit Review (2003); Reviewer Army Research grants (2002-2003; 2004-5); reviewer of several NIH ad hoc panels (2005-2008); Member of Training Grant Review Panel, Panel Chair, Quantum Grants, National Institutes of Health, Frequent reviewer of NIH and NSF grant programs
- Referee, Student Paper Competitions: Symposium of Computer Applic. Medical Care, 1984-86, IEEE Int. Conf. Eng. Med. Biol. Soc., 1989-1992
- Award Committee: Provost Award, 1998-present; Johns Hopkins University.
- Several Professorial promotion ad hoc committees, Johns Hopkins University, including Associate and Full Professor Promotion, Search Committees of Chairs of Radiology, Orthopedic Surgery.
- AIMBE Fellows nomination committee, 2003-2005; IEEE Ad Com, 2003-2004; IEEE EMBC Publications Committee; IEEE Ad Com 2006-present (Publications), 2008- (Awards)
- Consultant: American Edwards, GST Laboratories, Primary Care Software, Physio Control, Cardiac Pacemakers Inc., Eli Lilly & Co., DVP, Cadent, Infinite Biomedical Technologies.
- Advisory Boards: University of Wisconsin-Madison (Biomedical Eng), 2002-2004; University of Washington (Biomedical Engineering), 2005-present; Engineering Research Center, University of Southern California, Engineering Research Center 2004-2009, Cleveland Clinic (Biomedical Engineering): 2005-2008.
- Program Reviewer: University of Minnesota, Biomedical Engineering, 2009; University of Pittsburgh, Biomedical Engineering, 2010. University of Washington, Seattle, 2006-2010.
- Director, Neuroengineering Training Program, Johns Hopkins University (2004-present); Member Provost Research Award committee, chair or member of ad hoc promotion committees, member Whiting School of Engineering international program and collaboration group.

#### CONFERENCES AND ORGANIZATIONAL ACTIVITIES

- Chairman, workshop in "Pacemaker Technology," IEEE Int. Conf. EMBS, 1983;
- Tutorial on "Modern techniques of automated ECG analysis," IEEE Int. Conf. EMBS, 1984;
- "ECG signal processing," IEEE Int. Conf. EMBS, 1985;
- "Cardiac arrhythmias, pacing, and defibrillation," and "Medical Instrumentation," Annu. Conf. Eng. Med. Biol. Soc. (ACEMB), 1986; "Evoked potentials," IEEE Int. Conf. EMBS, 1987, 1988;
- "Computer applications Track," 1989; "Computers in Cardiology Conference;
- "ECG signal processing," IEEE Int. Conf. EMBS, 1990-1991; Track Chair, "Cardiology," IEEE Int. Conf. EMBS, 1991;
- Program coordinator, "Neurological Signal Processing," Biomed. Eng. Soc. Annual Mtg., 1991;
- Invited chair, "World Congress Biomed. Eng., Kyoto, Japan, 1991;
- Int. Track Chair, European Congress Biomed. Eng., 1991;
- Co-chair, tutorial program, "Frontiers of Computers in Biomedical Engineering," IEEE Int. Conf. Eng. Med. Biol. Soc., Paris, 1992;
- Invited tutorial, "Wavelet analysis of evoked potentials;" Chair, technical sessions on Electrocardiography and Computer Modeling of Arrhythmias; 1992;
- Tutorial workshop, "Supercomputers in Biomedical Engineering," IEEE Int. Conf. EMBS, 1993;
- Chair, "Wavelet Analysis," IEEE Int. Conf. EMBS, 1993;
- World Congress of Biomedical Engineering, Chair and Tutorials on Supercomputers" and "Computer Applications in Medicine,"
- ICASSP Conf, Session Chair, Biomedical Signal Processing, 1995;
- Track Chair, Biomedical/Neurological Signal Processing at IEEE Eng. Med. Biol. Soc., Montreal, 1995;
- Session Chair, Modeling and Simulation, Computers in Cardiology, 1996;
- Tutorial, "Cardiac Bioelectricity." Session chair, "EEG signal processing. Organizer/teacher: IEEE EMBS Summer School on "Biomedical Signal Processing." Track Chair, Neuroengineering, IEEE EMBS Conf, Hong Kong, 1998, and Atlanta, 1999;
- Conference Program Chair, BMES, Seattle, 2000;
- Keynote Presentation, Biosignal 2000, Brno, Czech Republic, 2000;
- Track Chair, Neural Engineering, BMES Annual Conference, 2001;

- Co-Track Chair, IEEE Eng. Medicine Biology Annual Conference, Istanbul, 2001;
- Theme Chair, Neural Engineering Systems, IEEE EMBS and BMES Joint Conference, Houston, October, 2002;
- Keynote invited speaker, Northeast Bioengineering Conference, April, 2002;
- Track Chair, Neuroengineering and Neuromuscular Systems, World Congress, 2003.
- Invited Chair, “Biosensors,” Third Annual BioMEMS & Biomedical NanoTechnology, 2002, Columbus OH;
- Program Committee, Neural Engineering workshop and conference, IEEE Eng. Medicine and Biology Society, Capri, 2003;
- Invited Chair, “Biosensors,” Fourth Annual BioMEMS & Biomedical NanoTechnology, 2003, Washington DC.
- Theme Chair, “Neural Engineering,” World Congress of Biomedical Engineering, Sydney, Australia, 2003;
- Program Committee, Fourth Annual BioMEMs and Nanotech World 2003 Conference;
- Program Co-Chair, 2<sup>nd</sup> Annual Biodefense Conference, Cambridge Healthtech, Washington D.C., Aug. 2003.
- Program Chair, Capital IIT (Pan IIT East Coast Chapter), Fall, 2003.
- Theme Chair, “Neural Engineering, Biomedical Engineering Society, Philadelphia, PA, 2004;
- Program Committee, Annual BioMEMs and Nanotech World, Aug, 2004 Conference;
- Program Co-Chair, 3<sup>rd</sup> Annual Biodefense Conference, Cambridge Healthtech, Aug, 2004;
- Theme Chair, “Brain and Neural Engineering,” IEEE Engineering in Medicine and Biology Conference, Shanghai, 2005;
- Conference Chair, Satellite Conference, “Micro-Nanotechnology for Neural Interfacing,” Beijing, China, 2005;
- Theme Chair, Neural Engineering, Biomedical Engineering Society, Baltimore, 2005; Invited Theme Chair, Neuroengineering, MEDI 2005, Hartford, CT.;
- Session Chair, ICORR 2007, Netherlands; Invited Theme Chair or session chair for IEEE Engineering Medicine and Biology Conference, 2006-20098;
- Chair, Workshop on “Beyond Brain Machine Interface,” IEEE Engineering in Medicine and Biology Society Conference, Minneapolis, MN , 2009;
- Chair, Frontiers of Biomedical Engineering Track, Biomedical Engineering Society, Pittsburgh, PA, 2009;
- Conference Chair, AMA-IEEE Conference on Personalized Medicine, March 21-23, 2010;
- Organizing committee: “Grand Challenges in Neuroengineering.” IEEE Engineering in Medicine and Biology Society, May 5-7, 2010;
- Workshop organizer/Chair, “Beyond Brain Machine Interface; from Motor to Sensory and Cognition,” sponsored by Army Research Office, June 20, 2010.
- Chair, several technical sessions, IEEE Engineering in Medicine and Biology Conference, Buenos Aieris, August, 2010.
- Organizing Committee, 5th International Summer School on Emerging Technologies in Biomedicine, “High Throughput Communication between Brain and Machines,” September 26th - October 1st 2010, Patras, Greece.
- Chair, IEEE Life Sciences Grand Challenges, December, 2013
- International Neurotechnology Consortium, Chair, 2012-2014 (Taiwan, Chicago, USA)
- Co-Chair, Optogenetics conference at SPIE, Biophotonics, San Fransisco, January/February, 2014-2016
- Chair, IEEE BIOROB, June, 2016 (Singapore).
- Co-Chair, Gordon Conference on Advanced Health Care Informatics, July 2016 (Hong Kong)
- International Conclave, IIT Gandhinagar, India, February, 2019.
- Conference Chair, Optogenetics, BIOS, SPIE, San Fransisco, 2015-2017.
- Conference Chair, Photonic Therapeutics and Diagnostics and Neurophotonics, BIOS, SPIE, San Fransisco, 2018, 2019.

#### **SELECTED INVITED PRESENTATIONS**

- “Ambulatory Arrhythmia Monitoring,” MIT, 1982.
- “ECG signal processing for arrhythmia detection,” Indian Institute of Technology, Bombay, India, December, 1983.
- “Biomedical signal processing,” Humboldt Institute, Berlin, August, 1984.
- “Design, implementation and evaluation of microcomputer-based ambulatory arrhythmia monitors,” Cibernetics Institute, Barcelona, Spain, December, 1986.

- “Computer models of Defibrillation,” PhysioControl Corp., 1986.
- “Biomedical Signal Processing,” New Jersey, Institute of Technology, Special Symposium, 1987.
- “Computer models of ventricular tachycardia and fibrillation,” Cardiac Pacemakers, Inc., Minneapolis, 1988, 1989.
- “Ventricular tachyarrhythmia detection,” Cardiac Pacemakers, Inc., Minneapolis, 1989.
- “Ambulatory monitor for QT-interval analysis in ischemic heart disease,” Symposium on Sudden Death, Barcelona, Spain, March, 1989.
- “Computer models of ventricular fibrillation and defibrillation,” Eli Lilly, Indianapolis, June, 1991.
- “Computer models of fibrillation and defibrillation,” Duke University, April, 1991.
- “Models of cardiac arrhythmias,” Niigata University, Japan, July 1991.
- “Evoked potential signal processing,” Nihon-Koden, Tokyo, Japan, July, 1991.
- “Neurological signal processing for neuro-critical monitoring,” Univ. Virginia, February, 1992.
- “Shock effects on isolated myocytes studied by the patch clamp method,” Purdue Defibrillation conference, September, 1992.
- “Detection of cardiac arrhythmias: normal, abnormal, chaotic,” Department of Statistics, Ohio State University, January, 1993.
- “Cardiac and neurological signal processing for patient monitoring,” Chinese Academy of Sciences, Shanghai, Nanjing, and Beijing, March, 1993.
- “Adaptive coherence estimation reveals nonlinear processes due to injury in brain,” Special Symp. Biomedical Signal Processing ICASSP Conference, Minneapolis, MN, April, 1993.
- “Signal processing and modeling in Cardiology,” BMT-Kongress (Joint German, Austrian Swiss Conference on Biomedical Engineering), Graz, Austria, September, 1993.
- “Neurocritical Care Monitoring,” IEEE Chapter, Carleton University, Ottawa, Canada, October, 1993.
- “Modeling and Signal Processing in Cardiology,” IEEE Eng. Med. Biol. Soc. Chapter, George Washington University, Washington D.C., November, 1993.
- “Supercomputer model for the study of fibrillation,” 2nd European Conference on Mathematics as Applied to Biology and Medicine, December, 1993, Lyon, France.
- “Wavelet and Time-frequency Methods in Biology and Medicine,” Tutorial presented at the World Congress of Biomedical Engineering, Rio de Janeiro, Brazil, August, 1994.
- “Frontiers of Computers in Biomedical Engineering,” Tutorial presented at the World Congress of Biomedical Engineering, Rio de Janeiro, Brazil, August, 1994.
- “High-speed optical imaging of spiral waves in cardiac tissue,” plenary talk (given by student Matthew Fishler) at the Computers in Cardiology Conference, Bethesda, MD, 1994.
- “Emerging problems in time-frequency-scale analysis of biomedical signals,” Introductory Talk at the Time-frequency and Time-scale Analysis Conference, Philadelphia, October, 1994.
- “Fundamental analysis of ventricular fibrillation signals,” and “Analysis of transient and time-varying evoked potentials for detection of brain injury,” presented at the Bat-sheva Seminar Series, Technion Israel Institute of Technology, Haifa, Israel, March, 1995.
- “Signals from the heart and brain: new problems and applications,” Biomedical Engineering Conference of Spanish Society in Catalunya, Barcelona, Spain, 1995.
- “Advances in Cardiac and Neurological Signal Processing,” Shanghai Jiaotong University, Shanghai, P.R. China, November, 1995.
- “Biomedical Signal Processing” several lectures presented as a Guest Professor of the Xi’an Jiao Tong University, Xi’an, P. R. China, November, 1995.
- “Spiral waves and wavelets in the heart: chaotic cardiac rhythms” invited presentation at the Symposium on Nonlinear Dynamics and Chaos at the CNR, Genoa, Italy, Dec., 1995.
- “Advanced biomedical signal processing applications in cardiology, neurology and rehabilitation,” University of Pittsburgh, April, 1996.
- “Biomedical applications of signal processing,” Northern Illinois University, April, 1996.
- “Biomedical signals and instrumentation in cardiology and neurology,” Biomedical Engineering Program, University of Pittsburgh, 1996.

- “Rotors and spiral waves: models of cardiac arrhythmias,” IEEE Annual Int. Conf. Eng. Med. Biol., Symposium on Bioelectricity, Chicago, IL, 1997.
- “Spiral Waves and Chaos in Heart,” University of Minnesota, 1998
- “Sequential hypothesis testing in arrhythmia detection,” Medtronic, Inc., 1998.
- “Parametric, nonparametric, and dynamical analysis methods for fibrillation detection,” CPI/Guidant, 1998.
- “Computer models of the heart: from single beat to fatal arrhythmias,” Keynote Speaker, IEEE Information Technology Applications in Biomedicine (ITAB '98), Washington D. C., 1998.
- “Chaotic Rhythms of the Heart: Models and Signals,” IBED '98 Conference, Istanbul, Turkey, May, 1998.
- “Chaos in the Cardiac Rhythm”, “Neuroengineering,” Plenary talks, IV FNCTS (Forum Nacional de Ciencia e Tecnologia em Saude), Curitiba, Brazil, 18-22 Oct, 1998.
- “Neuroengineering,” Colloquium, Applied Physics Lab, Baltimore, MD, 1999.
- “Medical Microsystems,” Medical Diagnostic Techniques and Procedures, Indian Institute of Technology, Chennai, India, December, 1999.
- “Neuroengineering,” and “Medical Microsystems” CIIE, Congreso Internacional de Ingenieria Electronica, Veracruz, Mexico, 2000.
- “Interpreting Brain's Message: Telling Normal from Abnormal.” EuroConference, Biosignal 2000, Brno, Czech Republic, June, 2000.
- “Entropy and Information Measures of Brain Rhythms,” Plenary Talk, IEEE Conference on Statistical Signal Processing, Singapore, 2001.
- “S.O.S. from the Brain: Brain’s Response to Neurological Injury,” Arizona State University, November, 2001.
- “Neural Microsystems” Plenary talk, International Biomedical Engineering Conference, Rotorua, New Zealand, Nov 2002.
- “Engineer’s Contact with the Brain,” Keynote presentation, the ICME Conference, Singapore, December 2002.
- “Medical Microsystems,” Invited presentation, Indian Institute of Technology, Bombay, India, December, 2002.
- “Time Dependent Entropy and Information Measures of Brain Injury,” Neuronal Variability and Noise, Dynamical Neurosciences Symposium, Society for Neuroscience, November, 2003.
- “Clinical Neuroengineering: Brain Monitoring from Bench to Bedside,” University of Akron, OH, 2003
- “Integrated Neurochemical Sensing: Interfacing VLSI to micro/nanosensors” Brigham Young University, 2003.
- “Brain signals as information carrier of brain-computer interface: beyond electrical,” BIOSIGNAL 2004, Brno, Czech Republic, June 2004.
- “Nanobioengineering,” 2<sup>nd</sup> Summer School on Emerging Technologies in Biomedicine, Patras, Greece, 20-25 June, 2004.
- “Nanotechnology: Frontiers of Biomedical Engineering,” Indian Institute of Technology, Roorkee; Indian Institute of Technology, Kanpur, 2005.
- “Frontiers of Neuroengineering,” Satellite Symposium, IEEE Eng Med Biol Soc, Beijing, 2005.
- “Clinical Neuroengineering,” Invited keynote talk; Biomedical Engineering Society, 2005.
- “Neuroengineering: from Bench to Bedside,” MEDI 2005, Hartford, CT, 2005.
- “A Bench to Bedside Story or How to Bring Ideas from Lab to Clinic?” Albert Eienstein, Neurology Grand Rounds; “
- “A Bench to Bedside Story or How to Bring Ideas from Lab to Clinic?” Department of Biomedical Engineering, Drexel University, January, 2006.
- “Interfaces to Brain and Mind,” University of California, Department of Biomedical Engineering, Irvine, January 2006.
- Distinguished Speaker Seminar “Neural Control of Prosthesis: Circuits, Signals and Systems,” Michigan State University, April 2006.
- “Neuroengineering Symposium” University of Minnesota, Medical Instrumentation Design Conference, Minneapolis, April, 2006.
- Invited keynote Speaker, “Neuroengineering” BIO-Korea, Sep 6-8, Seoul, Korea, 2006.
- “Signals and Systems for Neural Control of Dexterous Hand Prosthesis,” Neural Interface Workshop, Joint China-USA (National Science Foundation), Kunming, China, July 9-11, 2006.

- “Brain Machine Interface and Neural Prosthesis,” National Science Foundation, Collaborative Research in Computational Neurosciences, University of Maryland, College Park, June 2006.
- “Towards Dexterous Hand Prosthesis: Manipulation with Brain-Machine Interface,” University of Virginia, Charlottesville, VA, 26 October, 2007.
- “Body or Brain? Control of Dexterous Prosthesis” University of Delaware, Newark, Delaware, November 16, 2007.
- “Neural Signal Processing for Brain Machine Interface/Neural Prosthesis,” IMIT and University of Melbourne, Melbourne, December, 2007.
- Conference Plenary Speaker, IEEE Circuits and Systems and Signal Processing Society, “Circuits, Signals and Systems for Brain Machine Interface and Neural Prosthesis”, March, 2008.
- “Neural Prosthesis and Deep Brain Stimulation,” American Institute of Medical and Biomedical Engineering- AIMBE- Military Collaboration: Bioengineering Challenges of Brain Trauma, Washington DC, February 20, 2008.
- “Brain Computer Interface: Theory and Applications,” 6<sup>nd</sup> Summer School on Emerging Technologies in Biomedicine, Patras, Greece, July 3-5, 2008.
- “The Brain-Machine Interface and Neural Implants,” 16<sup>th</sup> Annual World Congress on Anti-Aging, July 17, 2008.
- “Neural Interfaces for Monitoring and Control,” 8th IEEE International Conference on BioInformatics and BioEngineering (BIBE 2008), October 8-10, 2008.
- “Mind Over Matter: Building a Brain Machine Interface,” Department of Neurology, Johns Hopkins School of Medicine, September 29, 2008.
- National Semiconductor Distinguished Faculty Seminar, “Medical Microelectronics: from Circuits, to Systems to Applications,” June 15, 2009.
- “Clinical Neuroengineering: Monitoring the Brain from Bench to Bedside,” Workshop on Engineering the Future of Medicine via Innovation and Collaboration, Postech, Korea, June 17-18, 2009.
- Plenary Talk “Taking Neural Signal Processing from Bench to Bedside,” The 6th International Workshop on Biosignal Interpretation.” Yale University, June 23-26, 2009.
- “Connecting Brain to Hand: Circuits and Signals for Neuroprosthetics,” Keynote Speaker, BioCAS conference, Beijing, China, Nov 25-27, 2009.
- “Neuroengineering,” Shanghai Jiao Tong University, Dec 3, 2009.
- “Decoding and Dexterity in Neuroprosthesis - Journey into Dimensionality,” Invited Speaker, Beijing BCI 2009 Symposium, Tsinghua University Conference on Neuroengineering, Dec 5-6, 2009.
- Keynote Speaker, “From Myoprosthesis to Neuroprosthesis,” ISSNIP Biosignals and Biorobotics Conference 2010, Vittoria, Brazil, January 4-6, 2010.
- “From Myoprosthesis to Neuroprosthesis: Emerging Technologies in Human-Machine Interface,” ISSNIP, Vittoria, Brazil, January 2010.
- “Neuroprosthesis: from Monkey to Man”, Louisiana Tech University, March 15, 2010
- Decade of Mind VI Conference: “Cognitive Science and Neurotechnologies: Looking Forward to the Next Ten Years”. Singapore, October 18-20, 2010.
- “Decoding and Dexterity in Neuroprosthesis - Journey into Dimensionality” University of California, Berkeley.
- Brain Machine Interface for Control of Prosthesis: What Does it Teach about how Brain is Organized and Codes Information?” Society for Experimental Biology, April 28, 2010.
- “Decoding and Augmenting Brain Machine Interface,” BIOISION, Alexandria, Egypt, April 14, 2010.
- “Neural Interfaces”, Distinguished Lecturer, IEEE Circuits Society, Postech University, Korea, May 14, 2010.
- “Mind-Brain-Machine Interface with Neural Microsystems,” A-STAR, Singapore, October, 2010.
- “Revolutionizing Prosthetics with Mind-Brain-Machine Interface,” 6<sup>th</sup> Decade of the Mind Conference, Singapore, October, 2010.
- “Revolutionizing Prosthetics: A Brain Machine Interface Solution,” University of Wisconsin, October, 2010.

- “Neuroengineering: Cells, Chips, Brains and Machines,” invited presentation at Krasow Institute, George Mason University, VA, March 2011.
- “Revolutionizing Prosthesis with BMI,” Plenary Presentation, First Middle East Conference on Biomedical Engineering, Sharjah, UAE, February, 2011.
- “Signals and Networks - from Neurons to Brain, for Building Brain Machine Interface,” invited presentation, Carnegie Mellon University, March 21, 2011.
- “Implanting the Brain Machine Interface: Circuits, Signals and Systems” Keynote Speaker, IEEE NEWCAS, Bordeaux, France, June, 2011.
- “Cortical Signals and Decoding Strategies for Dexterous Prosthesis,” Invited presentation, 3rd Annual Workshop on Brain-Machine Interfaces, IEEE Systems, Man, Cybernetics, Anchorage, Alaska, October, 2011.
- “High Dimensional BMI,” Keynote Speaker, IEEE BIOCAS, San Diego, Nov, 2011.
- “SiNAPSE Programme for Neurotechnology and Cognitive Science,” Keynote speaker, DR Tech Symposium, National University of Singapore, 2012.
- “Inaugural Professor Lecture,” National University of Singapore, Department of Electrical Engineering, May, 2012.
- Conference organizer and Chair, “International Neurotechnology Consortium,” BIOCAS meeting, Taiwan, November 2012.
- “Neurotechnology: Brain Monitoring to Brain Machine Interface, “Brain, Mind, Technologies; What’s New and What’s Next?” Bioethics Forum, January, 2013.
- Invited Keynote speaker, CMOS Emerging Technologies, Whistler, Canada, July 2013 (declined due to conflict)
- “Global Ischemic Brain Injury: Brain Rhythms from Entropy to Causality and from Cortex to Thalamus,” Cornell Medical Center, May 2013.
- “Translation: From Revolutionary Prosthesis to Affordable Prosthesis,” Invited Platform, IEEE Neural Engineering Conference, San Diego, CA, 6-9 Nov, 2013.
- “Frontiers of Brain Machine Interface: from Physical to Cognitive,” Plenary speaker, 6<sup>th</sup> IEEE Conference on Cybernetics and Intelligent Systems (CIS) and 6<sup>th</sup> IEEE Conference on Robotics, Automation and Mechatronics (RAM), Manila, 12-15 Nov, 2013.
- “Brain Machine Interface Technology: from Neurons to Prostheses,” Keynote speaker, International Conference on Biomedical Engineering (ICBME), Singapore, 4-7 December 2013.
- “Neuromorphic Engineering for Brain Machine Interface,” 9<sup>th</sup> International Conference on Intelligent Sensors, Sensor Networks, and Information Processing, ISSNIP, April 21-24, 2014, Singapore.
- “Neuroprosthetics, Neurorobotics, and Neurorehabilitation: Past, Present and Future,” Plenary Speaker, ICNR, 2014, Aalborg, Denmark, June 24-27, 2014.
- Invited Speaker, BRAIN Workshop, IEEE Engineering in Medicine and Biology Conference, Chicago, IL, August, 2014.
- “Brain on a Chip: Platform for Discovery,” Keynote Speaker: 6<sup>th</sup> International Conference on Microchemistry and Microsystems, Singapore, July 2014.
- “SiNAPSE: Translating Neurotechnologies,” Keynote Speaker, A\*STAR Symposium, September 26, 2014.
- “Neurotechnology: Building Implantable Brain Machine Interface,” Bioelectronics Symposium, Nanyang Technological University, October 19-21, 2014
- “Biologically Inspired Sensors and Intelligent Neural Decoding,” Sensors, Energy harvesting, wireless Network & Smart Objects: SENSO Conference, Gardanne, Aix En Provence, France, October 22, 2014.
- “Translating Brain Machine Interface (Neuroprosthesis) for Patients: From DARPA Revolutionizing Prosthesis to NIH Grand Challenge,” Johns Hopkins University Engineering Distinguished Faculty Lecture, September, 2014.
- Invited speaker, BIO4APS, Japan
- “Frontiers of Neurotechnology: from Neurochip to Cognitive Engineering,” City University of Hong Kong, January 2015.
- “Brain Machine Interface: Translating Neuroscience for Neuroprosthesis,” Brain Night Lecture, Johns Hopkins University, February, 2015.



- “Neuromorphic Engineering: Inspiration and Interface to Biology” Asia-Pacific Conference for Vision (APCV) 2015, July 10-12, Singapore.
- “Decoding Brain-Machine Interface: Semi-invasive ECoG Approaches,” Shanghai Symposium on Neural-Machine Interfacing, Shanghai, June 16-17, 2015.
- “*Cognitive Robotics*,” Plenary Speaker, ICORR, Singapore, July, 2015.
- Invited talk, “Laser Speckle and Photoacoustic Imaging of Brain Function and Pathology,” GIST, Korea, March, 2016.
- Invited talk, “Implantable Neurotechnologies for Building Brain and Nerve Interfaces,” KAIST, Korea, March, 2016.
- Keynote speaker, “*Brain, Mind and Machines: Can they all work together?*”, MEDICON, Paphos Cyprus, March, 2016
- Invited speaker, “*Neuromodulation Symposium*,” organized by the Institute for Engineering in Medicine, University of Minnesota, April, 2016
- Invited Lecture, “Neurophotonics by Laser Speckle Imaging and Photoacoustic Imaging,” IEEE OMN, July 2016 (Singapore)
- Invited Lecture/keynote: Media Tek Emerging Technology Forum. “Technology Linking Neurons-Brain-Mind: *Basic Science and Engineering to achieve Translation*.” Singapore, October 4, 2016.
- Invited Lecture: Singapore-Finland Research Seminar on Smart Innovations for Health and Education held in Singapore, “*Working Together: Brains and Machines*,” 18<sup>th</sup> October 2016.
- Invited Lecture: IRCIE 2016, “*Neurotechnology: Brains, Mind and Robots*,” Johorbaru, Malaysia, 19<sup>th</sup> October, 2016.
- Plenary Speaker for the iBEC2016(international Biomedical Engineering Conf), Seoul, Korea, 11<sup>th</sup> November, 2016.
- Invited participant, World Economic Forum, November 12<sup>th</sup>-14<sup>th</sup>, 2016, Dubai, UAE.
- Invited speaker, International Solid-State Circuits Conference, San Francisco, January 2016; forum on Circuit, Systems and Data Processing for Next Generation Wearable and Implantable Medical Devices “Implantable Neurotechnologies for Electroceuticals: Integrating Micro/Nano, VLSI, Data/Power, Systems.”
- GIAN Lectures, Government of India, New Delhi, February 25-March 3, 2017.
- Co-Chair, “Optogenetics” at SPIE, San Francisco, January 2017
- Plenary talk, “Neurotechnology: from Cells to Cognition, Mind to Machines,” ICBE Conference, 10 Nov, Seoul, Korea
- Keynote, “*Neuromodulation Symposium*,” organized by the Institute for Engineering in Medicine, University of Minnesota, April 13-14, 2017.
- Invited speaker, PERSH Conference, Washington DC, February, 2017
- Invited speaker, SRC Conference on Electronic Medicine, Washington DC, April, 2017.
- Keynote speaker, 2<sup>nd</sup> International Conferences for Innovations in Biomedical Engineering and Life Science, Penang, Malaysia, December 10-13, 2017.
- Invited speaker, “*Brain-Tech Frontiers*”, and “Cognitive Machines: Brains and Machines Working Together” Shanghai University, December 14, 2017.
- Invited Guest Lecturer, Government of India Global Initiative of Academic Networks (GIAN), “Advances in Neurotechnology and Brain Machine Interfaces,” Indian Institute of Technology, Kharagpur, India, January 15-22, 2018.
- Guest speaker, 13<sup>th</sup> Annual Scientific Meeting, Neuromodulation Society of Australia and New Zealand, Sydney, April 6-8, 2018.
- Keynote speaker, IEEE NEMS, April 2018, Singapore.
- Gordon Conference Invited speaker, “Advanced Health Care Informatics,” Hong Kong, June 16-22, 2018.
- Plenary Speaker, ““Giving Prosthesis the Feeling! Biomimetic and Neuromorphic Sensors” IEEE SENSORS 2018 October 28<sup>th</sup> – October 31<sup>st</sup> in New Delhi, India.
- Invited speaker, Nature Conference on Flexible Electronics: Visions of Flexible Future, “Frontiers of Neurotechnologies: from Cells to Brain and Mind, from Micro to Machines,” Xi’an, China October 12-15, 2019.

- Invited speaker, “E-dermis: Multi-layer, multi-receptor tactile array with neuromorphic algorithms detects texture, shape and provides a range of sensory perceptions Workshop: The First International Workshop on Smart Skins, Technical University of Munich, Germany, November, 2018.
- 13<sup>th</sup> Summer School, IEEE Engineering in Medicine and Biology Conference, Symposium on Medical Devices and Sensors, June 23-24, 2018, Macau (declined due to schedule conflict).
- Distinguished Lecturer, “Multimodality Functional Imaging of Brain Tumor and Stroke,” Cal Tech, January 30, 2019.
- Invited speaker, “Frontiers of Neurotechnology and Brain Machine Interface,” AUS Symposium on Biosciences and Bioengineering (SBSBE ’10), Sharjah, UAE, Feb 23-25, 2019.
- Invited speaker, BioPro A+ workshop on Feb. 13th-17th, 2019. (BioPro A+ 2019), Taipei, Taiwan, March 14-16, 2019.
- Distinguished Lecture, Center for Neuroprosthetics, EPFL, Geneva, Switzerland, April 16, 2019.
- Keynote speaker, ICIBEL 2019 Conference on Innovation on Biomedical Engineering & Life Sciences, Kuala Lumpur, Malaysia 6th – 7th December 2019.
- Invited speaker, International Conference on Neurological Disorders and Therapeutics, NIPER-Ahmedabad, India, 24-26 October 2019.
- Invited talk at XXVII Brazilian Congress on Biomedical Engineering (CBEB2020). Vitoria (Brazil), 2020.

## SPONSORED RESEARCH

### Johns Hopkins University

#### Ongoing research support

##### **Neuroengineering Training Grant**

5T32EB003383 (X. Wang, PI; Thakor, Co-PI)  
NIBIB

06/01/15 – 05/31/20 0 cal months  
\$ 345,856 (yearly), \$ 1,816,422 (total)

This is a training grant supporting predoctoral students from Johns Hopkins in department of Biomedical Engineering, Electrical Engineering, Neuroscience, etc. and provide research and training support.

##### **Temporal-spatial mapping of human language networks**

NIH – NINDS R01NS091139 (Crone, PI; Thakor, Co-I)

04/01/15 – 03/31/20 1.0 cal mo.

We use EEG recordings from the surface of the human brain to study the dynamics of brain networks responsible for speech and language and to use these dynamics for functional mapping.

##### **COLLAB: Scalable, Customizable Sensory Solutions for Dexterous Robotic Hands**

1830444 NSF: NRI: (Thakor, PI; Kaliki, Co-I)

09/01/18 – 08/31/21 0.5 Cal mo.  
\$352,863 (\$215,489

Direct \$137,374 IDC)

The goal is to develop high density, scalable biomimetic sensors and the neuromorphic algorithms for texture and shape recognition for prosthesis and robotic applications.

##### **Translational Technologies for Ameliorating Brain Injury**

NIH: 1 R01 HL139158-01A1 (PI: Thakor; Kannan, Co-PI)

09/01/18 – 08/31/22 2.0 Cal mo.  
Total - \$1,334,033 Direct \$837,695 IDC

In a model of cardiac arrest associated brain injury, we propose to determine the therapeutic effects of intranasal ORXA treatment on early neurophysiological recovery, cognitive and behavioural outcome following post-CA coma, and dendrimer nanotherapy using dendrimer conjugated to N-acetyl-L-cysteine (D-NAC) to reduce chronic neuro-inflammation, after resuscitation.

##### **A Wireless Multi-function Microscope for Lifetime Imaging of the Brain Tumor Vasculome**

NIH R01CA237597 Pathak (PI)

04/01/2019-03/31/2024 1 Cal. Mo.

Budget: \$250,000/year (direct costs)

The purpose of this project is to elucidate the role of these angiogenic and non-angiogenic pathways on brain tumor progression and necessitates the development of imaging tools that can characterize *in vivo* changes in the CNS vasculome over the entire lifetime of the disease  
(Expected to get funded)

#### PENDING

##### **Consequences of Cardiac Arrest: Brain Injury**

2 R01 HL071568-15 (Thakor, PI; Geocadin, Co-PI)

07/01/2019 – 06/30/2023 2~3 Cal mo.  
Direct \$ 1,771,688; Total \$ 2,847,844

The goal of this project is to study the effects of brain injury after cardiac arrest. The central hypothesis is that autoregulation is impaired, and this injury and recovery is studied using EEG/electrophysiology, magnetic resonance perfusion, and behavior, and treatment is provided by stimulation, ultrasound and pharmacology.

##### **A Patient-driven Rehabilitation System to Improve Upper Limb Amputee Outcomes”**

NIH SBIR Phase IIB (Kaliki, PI; Thakor Co-I)

12/01/2019 – 11/30/2021 0.5 Cal mo.

Direct \$202,678; Total \$ 325,103

Our goal is to implement an active coaching algorithmic components of the MyoTrain system for upper limb prosthesis training and control. This includes implementation of the cluster separation quantification algorithm, the pattern repeatability analysis algorithm, and to validate the functionality of these algorithms.

### **Sensory Perceptions and Feedback in Upper Limb Prosthesis**

1 R01 NS114012-01 (Thakor, PI)

12/01/2019 – 11/30/2023 2 Cal mo.

Direct \$1,000,000; Total \$ 1,543,967.00

This research program is highly applicable to enhancing the sensory capabilities of upper limb amputees. Our goal is to provide enhanced sensory perception, for both improved motor control and reduced discomfort. Our studies of pain perception and embodiment and cortical representations, understanding the tactile perception and, eventually, assessing and mitigating phantom limb pain.

### **Targeted Muscle Reinnervation on Chip**

4/1/2020-3/31/2022

0.5 Cal mo.

The goal of this project is to develop a microengineering chip for culturing neurons/axons for regeneration and myoblasts to form muscle tubes. This project will demonstrate targeted muscle reinnervation in vitro to model and mimic the in vivo conditions of nerve injury and regeneration and restoration of muscle activity.

### **Investigation of the Cortical Communication (CORTICOM) System**

NINDS – 1UH3NS114439-01 (PI: Crone, Co-I: Thakor) 12/01/2019 – 11/30/2024 0.6 Cal mo.

Summary: This early feasibility clinical trial will test the safety and efficacy of an implantable ECoG BCI to restore communication to patients with Locked-In Syndrome.

### **Blood Flow Imaging for Minimally Invasive Surgery**

NIH - PI: Rege, Abhishek; PI of sub-contract)

01/01/20 - 12/31/20

0.5 Cal. Mo.

Budget: \$71,738 (Subaward); Total Direct Costs: \$199,963

This project, in collaboration with Vasoptic Medical, will test a retinal imager using laser speckle imaging technology. The application will be blood flow imaging in brain, and testing will be done in a small animal model.

# National University of Singapore

## Table 1: Project(s) Awarded

S/N	Name	PI/co	Project title	Funding Agency	\$	Dates	% Effort
1	Prof Nitish Thakor	Lead P I	CRP – Neuroprosthesis	NRF	9,999,725	01/2014 to 12/2018	25%
2	Prof Nitish Thakor	Co-PI	Amyotrophic Lateral Sclerosis in NeuroChip	GSK	702,162	11/2014 to 11/2018	5%
3	Prof Nitish Thakor	PI	Neuromorphic Tactile Sensing” A Paradigm shift for prosthetics and Robotics Surgery	QNRF	389,797	01/2015 to 1/2018	5%
4	Prof Nitish Thakor	Co-PI	Surgical Photoacoustic Nanotechnology (SPAN)	NRF	7,284,970	6/2016 to 6/2021	10%
5	Prof Nitish Thakor	Co-PI	Contouring-fitting, high thermal conductivity and light weight hybrid fabrics for hypothermia treatment through a hybrid manufacturing process	A*STAR	501,600	07/2017 to 3/2021	5%
6	Prof Nitish Thakor	Co-I	A novel touch-based bilingual intervention to stave off cognitive decline in the elderly: the dual language intervention in semantic memory-computerized (DISC)	MOH	773,558	04/2017 to 04/2020	5%
7	Prof Nitish Thakor	PI	Decoding Olfactory Cognition: Fragrance perception of loving & portable sensor development	P&G	394,450	04/2018 to 04/2020	5%
8	Prof Nitish Thakor	Co-Pi	Multi-level Information Processing	DSO	497,400	04/2018 to 04/2020	5%

## Table 2: Project(s) Completed

No.	Name	Role	Project Title	Funding Agency	\$ requested (AcRF)	\$ requested (non-AcRF)	Duration
1	Prof Nitish Thakor	PI	Bioelectrics Innovation Challenge Ph1	GSK		260,000	03/2015 to 08/2015
2	Prof Nitish Thakor	Co-PI	Dynamic connectomics of lower limb motor cotez for exoskeleton robots (DARTER)	MOE ARF Tier II	576,455		1/2015 to 12/2017

**PUBLICATIONS**  
**(Peer-reviewed Scientific Journals)**

- [1] Thakor NV, "Reliable R-wave detection from ambulatory subjects," Biomed Sci Instrum, 14:67-72, 1978. <http://www.ncbi.nlm.nih.gov/pubmed/687736>
- [2] Thakor NV, Webster JG, "Ground-free ECG recording with two electrodes," IEEE Trans Biomed Eng, 27(12):699-704, 1980. <http://www.ncbi.nlm.nih.gov/pubmed/7084963>
- [3] Tompkins WJ, Thakor NV, "A lecture/laboratory course on microcomputer-based medical instrumentation," IEEE Trans. Educ., 96-101, 1981.
- [4] Thakor NV, "A detailed design example - ambulatory ECG monitoring," in Design of Microcomputer-based Medical Instrumentation, W.J. Tompkins and J.G. Webster, (Eds.), Englewood Cliffs, N.J.: Prentice Hall, 1981.
- [5] Thakor NV, "Prosthetics," in Design of Microcomputer-based Medical Instrumentation, W.J. Tompkins and J.G. Webster, (Eds.), Englewood Cliffs, N.J.: Prentice Hall, 1981.
- [6] Thakor NV, Webster JG, Tompkins WJ, "A battery-powered digital modem for telephone transmission of ECG data," IEEE Trans Biomed Eng, 29(5):355-9, 1982. <http://www.ncbi.nlm.nih.gov/pubmed/7084963>
- [7] Thakor NV, Webster JG, "Design and evaluation of QRS and noise detectors for ambulatory e.c.g. monitors," Med Biol Eng Comput, 20(6):709-14, 1982. <http://www.ncbi.nlm.nih.gov/pubmed/7169814>
- [8] Thakor NV, "A universal program for fully programmable pacemakers," Comput Biol Med, 13(4):271-9, 1983. <http://www.ncbi.nlm.nih.gov/pubmed/6876910>
- [9] Thakor NV, Webster JG, Tompkins WJ, "Optimal QRS detector," Med Biol Eng Comput, 21(3):343-50, 1983. <http://www.ncbi.nlm.nih.gov/pubmed/6876910>
- [10] Thakor NV, Webster JG, Tompkins WJ, "Design, implementation and evaluation of a microcomputer-based portable arrhythmia monitor," Med Biol Eng Comput, 22(2):151-9, 1984. <http://www.ncbi.nlm.nih.gov/pubmed/6717105>
- [11] Shipp GW, Thakor NV, "Multiattribute decision analysis of clinical errors: a case study of computerized arrhythmia detectors," Comput Biomed Res, 17(2):116-28, 1984. <http://www.ncbi.nlm.nih.gov/pubmed/6723269>
- [12] Thakor NV, Webster JG, Tompkins WJ, "Estimation of QRS complex power spectra for design of a QRS filter," IEEE Trans Biomed Eng, 31(11):702-6, 1984. <http://www.ncbi.nlm.nih.gov/pubmed/6500590>
- [13] Thakor NV, "From Holter monitors to automatic defibrillators: developments in ambulatory arrhythmia monitoring," IEEE Trans Biomed Eng, 31(12):770-8, 1984. <http://www.ncbi.nlm.nih.gov/pubmed/6396202>
- [14] Thakor NV, Webster JG, "Electrode studies for the long-term ambulatory ECG," Med Biol Eng Comput, 23(2):116-21, 1985. <http://www.ncbi.nlm.nih.gov/pubmed/3982090>
- [15] Chen S, Thakor NV, Wagner JW, "A microprocessor-based two-channel thromboelastograph," IEEE Trans Biomed Eng, 33(9):887-90, 1986. <http://www.ncbi.nlm.nih.gov/pubmed/3759121>
- [16] Vaz CA, Thakor NV, "Monitoring brain electrical and magnetic activity," IEEE/Eng. in Med. Biol. Magazine, 11-16, 1986.
- [17] Thakor NV, Moreau D, "Design and analysis of quantised coefficient digital filters: application to biomedical signal processing with microprocessors," Med Biol Eng Comput, 25(1):18-25, 1987. <http://www.ncbi.nlm.nih.gov/pubmed/3695602>
- [18] Thakor NV, "Adaptive filtering of evoked potentials," IEEE Trans Biomed Eng, 34(1):6-12, 1987. <http://www.ncbi.nlm.nih.gov/pubmed/3557484>
- [19] Thakor NV, McNeela M, "Application of dynamic programming algorithms to kinematics of dexterous hands," J. Robotics Systems, 4:341-3543, 1987.
- [20] Chen S, Thakor NV, Mower MM, "Ventricular fibrillation detection by a regression test on the autocorrelation function," Med Biol Eng Comput, 25(3):241-9, 1987. <http://www.ncbi.nlm.nih.gov/pubmed/3329694>
- [21] Lee HS, Cheng QL, Thakor NV, "ECG waveform analysis by significant point extraction. I. Data reduction," Comput Biomed Res, 20(5):410-27, 1987. <http://www.ncbi.nlm.nih.gov/pubmed/3677624>
- [22] Cheng QL, Lee HS, Thakor NV, "ECG waveform analysis by significant point extraction. II. Pattern matching," Comput Biomed Res, 20(5):428-42, 1987. <http://www.ncbi.nlm.nih.gov/pubmed/3677625>

- [23] Becker JC, Thakor NV, "A study of the range of motion of human fingers with application to anthropomorphic designs," IEEE Trans Biomed Eng, 35(2):110-7, 1988.  
<http://www.ncbi.nlm.nih.gov/pubmed/3350537>
- [24] Kothiyal KP, Shankar B, Fogelson LJ, Thakor NV, "Three-dimensional computer model of electric fields in internal defibrillation," Proc. IEEE, 76(6):720-730, 1988.
- [25] Thakor NV, "Cardiac monitoring," in Encyclopedia of Biomedical Instrumentation, J.G. Webster (ed.), Wiley: N.Y., 1988.
- [26] Thakor NV, "Computers in electrocardiography," in Encyclopedia of Biomedical Instrumentation, J.G. Webster (ed.), Wiley: N.Y., 1988.
- [27] Vaz CA, Thakor NV, "Adaptive Fourier estimation of time-varying evoked potentials," IEEE Trans Biomed Eng, 36(4):448-55, 1989. <http://www.ncbi.nlm.nih.gov/pubmed/2711966>
- [28] Murakawa Y, Gliner BE, Shankar B, Thakor NV, "The effect of an unsuccessful subthreshold shock on the energy requirement for the subsequent defibrillation," Am Heart J, 117(5):1065-9, 1989.  
<http://www.ncbi.nlm.nih.gov/pubmed/2711966>
- [29] Murakawa Y, Gliner BE, Thakor NV, "Success rate versus defibrillation energy: temporal profile and the most efficient defibrillation threshold," Am Heart J, 118(3):451-8, 1989.  
<http://www.ncbi.nlm.nih.gov/pubmed/2773769>
- [30] Thakor NV, Eisenman LN, "Three-dimensional computer model of the heart: fibrillation induced by extrastimulation," Comput Biomed Res, 22(6):532-45, 1989.  
<http://www.ncbi.nlm.nih.gov/pubmed/2480204>
- [31] Laguna P, Thakor NV, Caminal P, Jané R, Yoon HR, Bayés de Luna A, Martí V, Guindo J, "New algorithm for QT interval analysis in 24-hour Holter ECG: performance and applications," Med Biol Eng Comput, 28(1):67-73, 1990. <http://www.ncbi.nlm.nih.gov/pubmed/2325452>
- [32] Gliner BE, Murakawa Y, Thakor NV, "The defibrillation success rate versus energy relationship: Part I—Curve fitting and the most efficient defibrillation energy," Pacing Clin Electrophysiol, 13(3):326-38, 1990. <http://www.ncbi.nlm.nih.gov/pubmed/1690405>
- [33] Gliner BE, Murakawa Y, Thakor NV, "The defibrillation success rate versus energy relationship: Part II—Estimation with the "bootstrap," Pacing Clin Electrophysiol, 13(4):425-31, 1990.  
<http://www.ncbi.nlm.nih.gov/pubmed/1692126>
- [34] Laguna P, Thakor NV, Caminal P, Jañe R, "Low-pass differentiators for biological signals with known spectra: application to ECG signal processing," IEEE Trans Biomed Eng, 37(4):420-5, 1990.  
<http://www.ncbi.nlm.nih.gov/pubmed/2338356>
- [35] Thakor NV, Pan K, "Detection of tachycardia and fibrillation: a sequential time domain approach," IEEE Eng. Med. Biol. Magazine (Special Issue on Signal Processing, N.V. Thakor, Guest Ed.), 9:21-24, 1990.
- [36] Thakor NV, Zhu YS, Pan KY, "Ventricular tachycardia and fibrillation detection by a sequential hypothesis testing algorithm," IEEE Trans Biomed Eng, 37(9):837-43, 1990.  
<http://www.ncbi.nlm.nih.gov/pubmed/2227970>
- [37] Bankman IN, Thakor NV, "Noise reduction in biological step signals: application to saccadic EOG," Med Biol Eng Comput, 28(6):544-9, 1990. <http://www.ncbi.nlm.nih.gov/pubmed/2287177>
- [38] Natarajan A, Thakor NV, "Sensors for implantable pacemakers," Med Des Mater, 1(1):58-66, 1991.  
<http://www.ncbi.nlm.nih.gov/pubmed/10183944>
- [39] Thakor NV, Natarajan A, "The automatic implantable cardioverter-defibrillator: technology for preventing sudden cardiac death," Med Des Mater, 1(3):16-24, 1991.  
<http://www.ncbi.nlm.nih.gov/pubmed/10147992>
- [40] Thakor NV, Vaz CA, McPherson RW, Hanley DF, "Adaptive Fourier series modeling of time-varying evoked potentials: study of human somatosensory evoked response to etomidate anesthetic," Electroencephalogr Clin Neurophysiol, 80(2):108-18, 1991.  
<http://www.ncbi.nlm.nih.gov/pubmed/1707802>
- [41] Thakor NV, Zhu YS, "Applications of adaptive filtering to ECG analysis: noise cancellation and arrhythmia detection," IEEE Trans Biomed Eng, 38(8):785-94, 1991.  
<http://www.ncbi.nlm.nih.gov/pubmed/1937512>
- [42] Fishler MG, Thakor NV, "A massively parallel computer model of propagation through a two-dimensional cardiac syncytium," Pacing Clin Electrophysiol, 14(11 Pt 2):1694-9, 1991.  
<http://www.ncbi.nlm.nih.gov/pubmed/1721160>

- [43] Thakor NV, Wu D, Hipsley P, McLeod D, Hoehn-Saric R, "Microcomputer-based design of an ambulatory monitor for generalized anxiety disorders," in Case Studies in Medical Instrument Design, H. T. Nagle and W. J. Tompkins (eds.), pp. 149-162, 1992.
- [44] Tucker A, Menkes A, Natarajan A, Ferriz D, Thakor NV, "A microprocessor-based fitness monitor with analog voice feedback for runners," in Case Studies in Medical Instrument Design, H. T. Nagle and W. J. Tompkins (eds.), pp. 163-170, 1992.
- [45] Lightfoot JT, Thakor N, Biswijit S, Hanley DF, "Presyncope caused by central hypovolaemia is not preceded by evoked potential alterations," Clin Physiol, 12(3):267-75, 1992.  
<http://www.ncbi.nlm.nih.gov/pubmed/1606810>
- [46] Laguna P, Jané R, Meste O, Poon PW, Caminal P, Rix H, Thakor NV, "Adaptive filter for event-related bioelectric signals using an impulse correlated reference input: comparison with signal averaging techniques," IEEE Trans Biomed Eng, 39(10):1032-44, 1992.  
<http://www.ncbi.nlm.nih.gov/pubmed/1452169>
- [47] Province RA, Fishler MG, Thakor NV, "Effects of defibrillation shock energy and timing on 3-D computer model of heart," Ann Biomed Eng, 21(1):19-31, 1993.  
<http://www.ncbi.nlm.nih.gov/pubmed/8434817>
- [48] Nathan SS, Lesser RP, Gordon B, Thakor NV, "Electrical stimulation of the human cerebral cortex. Theoretical approach," Adv Neurol, 63:61-85, 1993. <http://www.ncbi.nlm.nih.gov/pubmed/8279318>
- [49] Thakor NV, Guo XR, Vaz CA, Laguna P, Jane R, Caminal P, Rix H, Hanley DF, "Orthonormal (Fourier and Walsh) models of time-varying evoked potentials in neurological injury," IEEE Trans Biomed Eng, 40(3):213-21, 1993. <http://www.ncbi.nlm.nih.gov/pubmed/8335325>
- [50] Nathan SS, Sinha SR, Gordon B, Lesser RP, Thakor NV, "Determination of current density distributions generated by electrical stimulation of the human cerebral cortex," Electroencephalogr Clin Neurophysiol, 86(3):183-92, 1993. <http://www.ncbi.nlm.nih.gov/pubmed/7680994>
- [51] Nathan SS, Lesser RP, Gordon B, Thakor NV, "Simulations of electrical stimulation of the human cerebral cortex," in Electrical and Magnetic Stimulation of Brain and Spinal Cord, A. Beric and M. Dogah (eds.), Raven Press: N.Y., pp. 113-137, 1993.
- [52] Thakor NV, Sun Y, Rix H, Caminal P, "MULTIWAVE: a wavelet-based ECG data compression algorithm," IEICE Trans. Information, Systems (Japan), E76-D:1462-1469, 1993.
- [53] Thakor NV, Guo XR, Sun YC, Hanley DF, "Multiresolution wavelet analysis of evoked potentials," IEEE Trans Biomed Eng, 40(11):1085-94, 1993. <http://www.ncbi.nlm.nih.gov/pubmed/8307591>
- [54] Vaz CA, Kong X, Thakor NV, "An adaptive estimation of periodic signals using a Fourier linear combiner," IEEE Trans. Sig. Proc., 42(1):1-10, 1994.
- [55] Baykal A, Ranjan R, Thakor NV, "Model-based analysis of the ECG during early stages of ventricular fibrillation," J Electrocardiol, 27 Suppl:84-90, 1994. <http://www.ncbi.nlm.nih.gov/pubmed/7884382>
- [56] Thakor NV, Natarajan A, Tomaselli GF, "Multiway sequential hypothesis testing for tachyarrhythmia discrimination," IEEE Trans Biomed Eng, 41(5):480-7, 1994.  
<http://www.ncbi.nlm.nih.gov/pubmed/8070808>
- [57] Thakor NV, "Adaptive filters for analysis of intra-cardiac signals," Med Biol Eng Comput, 32(4 Suppl):S19-24, 1994. <http://www.ncbi.nlm.nih.gov/pubmed/7967834>
- [58] Meste O, Rix H, Caminal P, Thakor NV, "Ventricular late potentials characterization in time-frequency domain by means of a wavelet transform," IEEE Trans Biomed Eng, 41(7):625-34, 1994.  
<http://www.ncbi.nlm.nih.gov/pubmed/7927383>
- [59] Yi-Sheng Z, Bin Z, Thakor NV, "Variable convergence adaptive filter and its application to cardiac action potentials," Med Biol Eng Comput, 32(6):673-8, 1994.  
<http://www.ncbi.nlm.nih.gov/pubmed/7723429>
- [60] Fishler MG, Thakor NV, "A computer model study of the ventricular fibrillation vulnerable window: sensitivity to regional conduction depressions," Ann Biomed Eng, 22(6):610-21, 1994.  
<http://www.ncbi.nlm.nih.gov/pubmed/7872571>
- [61] Fishler MG, Sobie EA, Tung L, Thakor NV, "Cardiac responses to premature monophasic and biphasic field stimuli. Results from cell and tissue modeling studies," J Electrocardiol, 28 Suppl:174-9, 1995.  
<http://www.ncbi.nlm.nih.gov/pubmed/8656107>
- [62] Thakor NV, Kong X, Hanley DF, "Nonlinear changes in brain's response in the event of injury as detected by adaptive coherence estimation of evoked potentials," IEEE Trans Biomed Eng, 42(1):42-51, 1995. <http://www.ncbi.nlm.nih.gov/pubmed/7851929>



- [63] Poon P, Koehler RC, Thakor NV, "Rapid measurement of somatosensory evoked potential response to cerebral artery occlusion," *Med Biol Eng Comput*, 33(3 Spec No):396-402, 1995. <http://www.ncbi.nlm.nih.gov/pubmed/7666686>
- [64] Ferrari M, Williams MA, Wilson DA, Thakor NV, Traystman RJ, Hanley DF, "Cat brain cytochrome-c oxidase redox changes induced by hypoxia after blood-fluorocarbon exchange transfusion," *Am J Physiol*, 269(2 Pt 2):H417-24, 1995. <http://www.ncbi.nlm.nih.gov/pubmed/7653605>
- [65] Gramatikov B, Yi-Chun S, Rix H, Caminal P, Thakor NV, "Multiresolution wavelet analysis of the body surface ECG before and after angioplasty," *Ann Biomed Eng*, 23(5):553-61, 1995. <http://www.ncbi.nlm.nih.gov/pubmed/7503458>
- [66] Ranjan R, Thakor NV, "Electrical stimulation of cardiac myocytes," *Ann Biomed Eng*, 23(6):812-21, 1995. <http://www.ncbi.nlm.nih.gov/pubmed/8572431>
- [67] Laguna P, Jane R, Olmos S, Thakor NV, Rix H, Caminal P, "Adaptive estimation of QRS complex wave features of ECG signal by the Hermite model," *Med Biol Eng Comput*, 34(1):58-68, 1996. <http://www.ncbi.nlm.nih.gov/pubmed/8857313>
- [68] Riviere CN, Thakor NV, "Effects of age and disability on tracking tasks with a computer mouse: accuracy and linearity," *J Rehabil Res Dev*, 33(1):6-15, 1996. <http://www.ncbi.nlm.nih.gov/pubmed/8868412>
- [69] Kong X, Thakor NV, "Adaptive estimation of latency changes in evoked potentials," *IEEE Trans Biomed Eng*, 43(2):189-97, 1996. <http://www.ncbi.nlm.nih.gov/pubmed/8682530>
- [70] Fishler MG, Sobie EA, Thakor NV, Tung L, "Mechanisms of cardiac cell excitation with premature monophasic and biphasic field stimuli: a model study," *Biophys J*, 70(3):1347-62, 1996. <http://www.ncbi.nlm.nih.gov/pubmed/8785290>
- [71] Riviere CN, Thakor NV, "Modeling and canceling tremor in human-machine interfaces," *IEEE Eng. Med. Biol.*, 15(3):29-36, 1996.
- [72] Braun JC, Hanley DF, Thakor NV, "Detection of neurological injury using time-frequency analysis of the somatosensory evoked potential," *Electroencephalogr Clin Neurophysiol*, 100(4):310-8, 1996. <http://www.ncbi.nlm.nih.gov/pubmed/17441301>
- [73] Ferrero JM Jr, Sáiz J, Ferrero JM, Thakor NV, "Simulation of action potentials from metabolically impaired cardiac myocytes. Role of ATP-sensitive K<sup>+</sup> current," *Circ Res*, 79(2):208-21, 1996. <http://www.ncbi.nlm.nih.gov/pubmed/8755997>
- [74] Casaleggio A, Corana A, Ranjan R, Thakor NV, "Dimensional analysis of the electrical activity in fibrillating isolated hearts," *Int. J. Bifurc. Chaos*, 6(8): 1547-1561, 1996.
- [75] Stinglele R, Wagner B, Kameneva MV, Williams MA, Wilson DA, Thakor NV, Traystman RJ, Hanley DF, "Reduction of cytochrome-c oxidase copper precedes failing cerebral O<sub>2</sub> utilization in fluorocarbon-perfused cats," *Am J Physiol*, 271(2 Pt 2):H579-87, 1996. <http://www.ncbi.nlm.nih.gov/pubmed/8770099>
- [76] Goel V, Brambrink AM, Baykal A, Koehler RC, Hanley DF, Thakor NV, "Dominant frequency analysis of EEG reveals brain's response during injury and recovery," *IEEE Trans Biomed Eng*, 43(11):1083-92, 1996. <http://www.ncbi.nlm.nih.gov/pubmed/9214826>
- [77] Fishler MG, Sobie EA, Tung L, Thakor NV, "Modeling the interaction between propagating cardiac waves and monophasic and biphasic field stimuli: the importance of the induced spatial excitatory response," *J Cardiovasc Electrophysiol*, 7(12):1183-96, 1996. <http://www.ncbi.nlm.nih.gov/pubmed/8985807>
- [78] Thakor NV, Ranjan R, Rajasekhar S, Mower MM, "Effect of varying pacing waveform shapes on propagation and hemodynamics in the rabbit heart," *Am J Cardiol*, 79(6A):36-43, 1997. <http://www.ncbi.nlm.nih.gov/pubmed/9080865>
- [79] Wang T. and Thakor N. V., "A Model of the Possible Role of Gaseous Neuromessenger Nitric Oxide in Synaptic Potentiation," *Comput. Neurosci.*, pp. 29-35, 1997. [http://dx.doi.org/10.1007/978-1-4757-9800-5\\_6](http://dx.doi.org/10.1007/978-1-4757-9800-5_6)
- [80] Baykal A, Ranjan R, Thakor NV, "Estimation of the ventricular fibrillation duration by autoregressive modeling," *IEEE Trans Biomed Eng*, 44(5):349-56, 1997. <http://www.ncbi.nlm.nih.gov/pubmed/9125819>
- [81] Riviere CN, Reich SG, Thakor NV, "Adaptive Fourier modeling for quantification of tremor," *J Neurosci Methods*, 74(1):77-87, 1997. <http://www.ncbi.nlm.nih.gov/pubmed/9210577>

- [82] Sherman DL, Tsai YC, Rossell LA, Mirski MA, Thakor NV, "Spectral analysis of a thalamus-to-cortex seizure pathway," *IEEE Trans Biomed Eng*, 44(8):657-64, 1997.  
<http://www.ncbi.nlm.nih.gov/pubmed/9254979>
- [83] Ranjan R, Chiamvimonvat N, Thakor NV, Tomaselli GF, Marban E, "Mechanism of anode break stimulation in the heart," *Biophys J*, 74(4):1850-63, 1998.  
<http://www.ncbi.nlm.nih.gov/pubmed/9545047>
- [84] Thakor NV, "Biopotentials and electrophysiology," in *The Measurements, Instrumentation, and Sensors Handbook*, J.G. Webster (Ed.), Boca Raton, FL: CRC Press, 1998.
- [85] Riviere CN, Rader RS, Thakor NV, "Adaptive canceling of physiological tremor for improved precision in microsurgery," *IEEE Trans Biomed Eng*, 45(7):839-46, 1998.  
<http://www.ncbi.nlm.nih.gov/pubmed/9644892>
- [86] Muthuswamy J, Thakor NV, "Spectral analysis methods for neurological signals," *J Neurosci Methods*, 83(1):1-14, 1998. <http://www.ncbi.nlm.nih.gov/pubmed/9765047>
- [87] Thakor NV, Ferrero JM Jr, Saiz J, Gramatikov BI, Ferrero JM Sr, "Electrophysiologic models of heart cells and cell networks," *IEEE Eng Med Biol Mag*, 17(5):73-83, 1998.  
<http://www.ncbi.nlm.nih.gov/pubmed/9770609>
- [88] Park JK, Tran PH, Chao JK, Ghodadra R, Rangarajan R, Thakor NV, "In vivo nitric oxide sensor using non-conducting polymer-modified carbon fiber," *Biosens Bioelectron*, 13(11):1187-95, 1998.  
<http://www.ncbi.nlm.nih.gov/pubmed/9871974>
- [89] Muthuswamy J, Sherman DL, Thakor NV, "Higher-order spectral analysis of burst patterns in EEG," *IEEE Trans Biomed Eng*, 46(1):92-9, 1999. <http://www.ncbi.nlm.nih.gov/pubmed/9919830>
- [90] Saiz J, Ferrero JM Jr, Monserrat M, Ferrero JM, Thakor NV, "Influence of electrical coupling on early afterdepolarizations in ventricular myocytes," *IEEE Trans Biomed Eng*, 46(2):138-47, 1999.  
<http://www.ncbi.nlm.nih.gov/pubmed/9932335>
- [91] Muthuswamy J, Tran P, Rangarajan R, Lenz FA, Hanley DF, Thakor NV, "Somatosensory stimulus entrains spindle oscillations in the thalamic VPL nucleus in barbiturate anesthetized rats," *Neurosci Lett*, 262(3):191-4, 1999. <http://www.ncbi.nlm.nih.gov/pubmed/10218888>
- [92] Zhang XS, Zhu YS, Thakor NV, Wang ZM, Wang ZZ, "Modeling the relationship between concurrent epicardial action potentials and bipolar electrograms," *IEEE Trans Biomed Eng*, 46(4):365-76, 1999.  
<http://www.ncbi.nlm.nih.gov/pubmed/10217874>
- [93] Zhang XS, Zhu YS, Thakor NV, Wang ZZ, "Detecting ventricular tachycardia and fibrillation by complexity measure," *IEEE Trans Biomed Eng*, 46(5):548-55, 1999.  
<http://www.ncbi.nlm.nih.gov/pubmed/10230133>
- [94] Kong X, Brambrink A, Hanley DF, Thakor NV, "Quantification of injury-related EEG signal changes using distance measures," *IEEE Trans Biomed Eng*, 46(7):899-901, 1999.  
<http://www.ncbi.nlm.nih.gov/pubmed/10396909>
- [95] Sherman DL, Brambrink AM, Ichord RN, Dasika VK, Koehler RC, Traystman RJ, Hanley DF, Thakor NV, "Quantitative EEG during early recovery from hypoxic-ischemic injury in immature piglets: burst occurrence and duration," *Clin Electroencephalogr*, 30(4):175-83, 1999.  
<http://www.ncbi.nlm.nih.gov/pubmed/10513324>
- [96] Muthuswamy J, Sherman DL, Thakor NV, "Message from the Brain," in *Medical Diagnostic Techniques and Procedures*, M. Singh et al. (eds), pp. 82-94, 1999.
- [97] Thakor NV, Tsai YC, Meyer MA, George PM, Bandyopadhyay A, "Medical Microsystems," in *Medical Diagnostic Techniques and Procedures*, M. Singh et al. (eds), pp. 256-265, 1999.
- [98] Shenai M, Gramatikov B, Thakor NV, "Computer Models of Depolarization Alterations Induced By Myocardial Ischemia: The Effect of Superimposed Ischemic Inhomogeneities on Propagation in Space-, Time-, and Time-Frequency Domains," *J. Biol. Systems (Special Issue)*, 1-22, 1999.
- [99] Geocadin RG, Muthuswamy J, Sherman DL, Thakor NV, Hanley DF, "Early electrophysiological and histologic changes after global cerebral ischemia in rats," *Mov Disord*, 15 Suppl 1:14-21, 2000.  
<http://www.ncbi.nlm.nih.gov/pubmed/10755267>
- [100] Johnson LJ, Hanley DF, Thakor NV, "Optical light scatter imaging of cellular and sub-cellular morphology changes in stressed rat hippocampal slices," *J Neurosci Methods*, 98(1):21-31, 2000.  
<http://www.ncbi.nlm.nih.gov/pubmed/10837867>

- [101] Gramatikov B, Brinker J, Yi-chun S, Thakor NV, "Wavelet analysis and time-frequency distributions of the body surface ECG before and after angioplasty," *Comput Methods Programs Biomed*, 62(2):87-98, 2000. <http://www.ncbi.nlm.nih.gov/pubmed/10764935>
- [102] Thakral A, Stein LH, Shenai M, Gramatikov BI, Thakor NV, "Effects of anodal vs. cathodal pacing on the mechanical performance of the isolated rabbit heart," *J Appl Physiol*, 89(3):1159-64, 2000. <http://www.ncbi.nlm.nih.gov/pubmed/10956364>
- [103] Geocadin RG, Ghodadra R, Kimura T, Lei H, Sherman DL, Hanley DF, Thakor NV, "A novel quantitative EEG injury measure of global cerebral ischemia," *Clin Neurophysiol*, 111(10):1779-87, 2000. <http://www.ncbi.nlm.nih.gov/pubmed/11018492>
- [104] Zhang JW, Liu JR, Zheng CX, Tao WZ, Thakor NV, Xie A, "Noninvasive early detection of focal cerebral ischemia," *IEEE Eng Med Biol Mag*, 19(6):74-81, 2000. <http://www.ncbi.nlm.nih.gov/pubmed/11103709>
- [105] Monserrat M, Saiz J, Ferrero JM Jr, Ferrero JM, Thakor NV, "Ectopic activity in ventricular cells induced by early afterdepolarizations developed in Purkinje cells," *Ann Biomed Eng*, 28(11):1343-51, 2000. <http://www.ncbi.nlm.nih.gov/pubmed/11212952>
- [106] George P, Muthuswamy J, Curie J, Thakor NV, Paranjape P, "Fabrication of screen-printed carbon electrode arrays for sensing neuronal messengers," *Biomedical Microdevices*, 3(4): 307-317, 2001.
- [107] Lee YJ, Zhu YS, Xu YH, Shen MF, Tong SB, Thakor NV, "The nonlinear dynamical analysis of the EEG in schizophrenia with temporal and spatial embedding dimension," *J Med Eng Technol*, 25(2):79-83, 2001. <http://www.ncbi.nlm.nih.gov/pubmed/11452637>
- [108] Hongxuan Z, Yisheng Z, Yuhong X, Thakor NV, "Pathological analysis of myocardial cell under ventricular tachycardia and fibrillation based on symbolic dynamics," *J Med Eng Technol*, 25(3):112-7, 2001. <http://www.ncbi.nlm.nih.gov/pubmed/11530825>
- [109] Lee YJ, Zhu YS, Xu YH, Shen MF, Zhang HX, Thakor NV, "Detection of non-linearity in the EEG of schizophrenic patients," *Clin Neurophysiol*, 112(7):1288-94, 2001. <http://www.ncbi.nlm.nih.gov/pubmed/11516741>
- [110] Boustany NN, Kuo SC, Thakor NV, "Optical scatter imaging: subcellular morphometry in situ with Fourier filtering," *Opt Lett*, 26(14):1063-5, 2001. <http://www.ncbi.nlm.nih.gov/pubmed/18049520>
- [111] Tong S, Bezerianos A, Paul J, Zhu Y, Thakor N, "Removal of ECG interference from the EEG recordings in small animals using independent component analysis," *J Neurosci Methods*, 108(1):11-7, 2001. <http://www.ncbi.nlm.nih.gov/pubmed/11459613>
- [112] Wang Y, Zhu YS, Thakor NV, Xu YH, "A short-time multifractal approach for arrhythmia detection based on fuzzy neural network," *IEEE Trans Biomed Eng*, 48(9):989-95, 2001. <http://www.ncbi.nlm.nih.gov/pubmed/11534847>
- [113] Luft AR, Kaelin-Lang A, Hauser TK, Cohen LG, Thakor NV, Hanley DF, "Transcranial magnetic stimulation in the rat," *Exp Brain Res*, 140(1):112-21, 2001. <http://www.ncbi.nlm.nih.gov/pubmed/11500803>
- [114] Paul JS, Luft AR, Hanley DF, Thakor NV, "Coherence-weighted Wiener filtering of somatosensory evoked potentials," *IEEE Trans Biomed Eng*, 48(12):1484-8, 2001. <http://www.ncbi.nlm.nih.gov/pubmed/11759930>
- [115] Tong S, Bezerianos A, Paul J, Zhu Y, Thakor NV, "Nonextensive entropy measure of EEG following brain injury from cardiac arrest," *Physica A*, 305(3-4):619-628, 2002.
- [116] Muthuswamy J, Kimura T, Ding MC, Geocadin R, Hanley DF, Thakor NV, "Vulnerability of the thalamic somatosensory pathway after prolonged global hypoxic-ischemic injury," *Neuroscience*, 115(3):917-29, 2002. <http://www.ncbi.nlm.nih.gov/pubmed/12435429>
- [117] McIntyre CC, Thakor NV, "Uncovering the mechanisms of deep brain stimulation for Parkinson's disease through functional imaging, neural recording, and neural modeling," *Crit Rev Biomed Eng*, 30(4-6):249-81, 2002. <http://www.ncbi.nlm.nih.gov/pubmed/12739751>
- [118] Sauer CM, Tomlin DH, Mozaffari Naeini H, Gerovichev O, Thakor NV, "Real-time measurement of blood vessel occlusion during microsurgery," *Comput Aided Surg*, 7(6):364-70, 2002. <http://www.ncbi.nlm.nih.gov/pubmed/12731099>
- [119] Luft AR, Kaelin-Lang A, Hauser TK, Buitrago MM, Thakor NV, Hanley DF, Cohen LG, "Modulation of rodent cortical motor excitability by somatosensory input," *Exp Brain Res*, 142(4):562-9, 2002. <http://www.ncbi.nlm.nih.gov/pubmed/11845251>

- [120] Sherman DL, Atit MK, Geocadin RG, Venkatesha SV, Hanley DF, Natarajan AL, Thakor NV, "Diagnostic instrumentation for neurological injury," IEEE Instrum. Measurement Mag., 5:28-35, 2002.
- [121] Bandyopadhyay A, Johnson L, Chung W, Thakor NV, "Protection by rapid chemical preconditioning of stressed hippocampal slice: a study of cellular swelling using optical scatter imaging," Brain Res, 945(1):79-87, 2002. <http://www.ncbi.nlm.nih.gov/pubmed/12113954>
- [122] Boustany NN, Drezek R, Thakor NV, "Calcium-induced alterations in mitochondrial morphology quantified in situ with optical scatter imaging," Biophys J, 83(3):1691-700, 2002. <http://www.ncbi.nlm.nih.gov/pubmed/12202392>
- [123] Geocadin RG, Sherman DL, Christian Hansen H, Kimura T, Niedermeyer E, Thakor NV, Hanley DF, "Neurological recovery by EEG bursting after resuscitation from cardiac arrest in rats," Resuscitation, 55(2):193-200, 2002. <http://www.ncbi.nlm.nih.gov/pubmed/12413758>
- [124] Johnson LJ, Chung W, Hanley DF, Thakor NV, "Optical scatter imaging detects mitochondrial swelling in living tissue slices," Neuroimage, 17(3):1649-57, 2002. <http://www.ncbi.nlm.nih.gov/pubmed/12414303>
- [125] Boardman A, Schlindwein FS, Thakor NV, Kimura T, Geocadin RG, "Detection of asphyxia using heart rate variability," Med Biol Eng Comput, 40(6):618-24, 2002. <http://www.ncbi.nlm.nih.gov/pubmed/12507311>
- [126] Luft AR, Buitrago MM, Paul JS, Hagan J, Ding MC, Thakor N, Hanley DF, "Early restitution of electrocorticogram predicts subsequent behavioral recovery from cardiac arrest," J Clin Neurophysiol, 19(6):540-6, 2002. <http://www.ncbi.nlm.nih.gov/pubmed/12488785>
- [127] Boustany, NN; Tsai, YC; Pfister, B; et al., "Optical scatter imaging to track mitochondrial alterations during programmed cell death," CYTOMETRY Pages: 40, 2002
- [128] Bezerianos A, Tong S, Thakor N, "Time-dependent entropy estimation of EEG rhythm changes following brain ischemia," Ann Biomed Eng, 31(2):221-32, 2003. <http://www.ncbi.nlm.nih.gov/pubmed/12627829>
- [129] Boustany N. and Thakor N. V., "In-Vitro Monitoring of Cells and Thin Biological Specimens with Elastic Light Scattering Techniques," in Biomedical Photonics Handbook, Editor: Tuan Vo-Dinh, Ph.D., CRC press, Boca Raton, FL, p 16.1-16.23, 2003.
- [130] Mirski MA, Tsai YC, Rossell LA, Thakor NV, Sherman DL, "Anterior thalamic mediation of experimental seizures: selective EEG spectral coherence," Epilepsia, 44(3):355-65, 2003. <http://www.ncbi.nlm.nih.gov/pubmed/12614391>
- [131] Al-Nashash HA, Paul JS, Ziai WC, Hanley DF, Thakor NV, "Wavelet entropy for subband segmentation of EEG during injury and recovery," Ann Biomed Eng, 31(6):653-8, 2003. <http://www.ncbi.nlm.nih.gov/pubmed/12797614>
- [132] Passeraub PA, Almeida AC, Thakor NV, "Design, microfabrication and characterization of a microfluidic chamber for the perfusion of brain tissue slices," Biomedical Microdevices, 5:147-155, 2003.
- [133] Tsai YC, Fishman PS, Thakor NV, Oyler GA, "Parkin facilitates the elimination of expanded polyglutamine proteins and leads to preservation of proteasome function," J Biol Chem, 278(24):22044-55, 2003. <http://www.ncbi.nlm.nih.gov/pubmed/12676955>
- [134] Tong S, Bezerianos A, Malhotra A, Zhu Y, Thakor N, "Parameterized entropy analysis of EEG following hypoxic-ischemic brain injury," Phys Lett A, 314(5-6):354-361, 2003.
- [135] Paul JC, Patel CB, Zhang N, Ziai WC, Mirski MA, Sherman DL, "Sequential Detection of PTZ-Induced Seizures Using Wavelet-based Residual Entropy," IEEE Trans. Biomed. Eng. (Special Issue on Seizure Predictions and Devices), 49:640-648, 2003.
- [136] Ray S, Jouny CC, Crone NE, Boatman D, Thakor NV, Franaszczuk PJ, "Human ECoG analysis during speech perception using matching pursuit: a comparison between stochastic and dyadic dictionaries," IEEE Trans Biomed Eng, 50(12):1371-3, 2003. <http://www.ncbi.nlm.nih.gov/pubmed/14656066>
- [137] Moraru L, Cimponeriu L, Tong S, Thakor N, Bezerianos A, "Characterization of heart rate variability changes following asphyxia in rats," Methods Inf Med, 43(1):118-21, 2004. <http://www.ncbi.nlm.nih.gov/pubmed/15026851>
- [138] Thakor NV, Tong S, "Advances in quantitative electroencephalogram analysis methods," Annu Rev Biomed Eng, 6:453-95, 2004. <http://www.ncbi.nlm.nih.gov/pubmed/15255777>

- [139] McIntyre CC, Mori S, Sherman DL, Thakor NV, Vitek JL, "Electric field and stimulating influence generated by deep brain stimulation of the subthalamic nucleus," *Clin Neurophysiol*, 115(3):589-95, 2004. <http://www.ncbi.nlm.nih.gov/pubmed/15036055>
- [140] McIntyre CC, Grill WM, Sherman DL, Thakor NV, "Cellular effects of deep brain stimulation: model-based analysis of activation and inhibition," *J Neurophysiol*, 91(4):1457-69, 2004. <http://www.ncbi.nlm.nih.gov/pubmed/14668299>
- [141] Al-Nashash H, Al-Assaf Y, Paul J, Thakor NV, "EEG signal modeling using adaptive Markov process amplitude," *IEEE Trans Biomed Eng*, 51(5):744-51, 2004. <http://www.ncbi.nlm.nih.gov/pubmed/15132500>
- [142] Sherman DL, Patel CB, Zhang N, Rossell LA, Tsai YC, Thakor NV, Mirski MA, "Sinusoidal modeling of ictal activity along a thalamus-to-cortex seizure pathway I: new coherence approaches," *Ann Biomed Eng*, 32(9):1252-64, 2004. <http://www.ncbi.nlm.nih.gov/pubmed/15493512>
- [143] Buitrago MM, Luft AR, Thakor NV, Blue ME, Hanley DF, "Effects of somatosensory electrical stimulation on neuronal injury after global hypoxia-ischemia," *Exp Brain Res*, 158(3):336-44, 2004. <http://www.ncbi.nlm.nih.gov/pubmed/15146305>
- [144] Thakor NV, Iyer V, Shenai M, "From Cellular Electrophysiology to Electrocardiography," *Modeling and Imaging of Bioelectric Activity: Principles and Applications*, He, B. (Ed), Kluwer Academic/Plenum Pub: N. Y., pp. 1-38, 2004.
- [145] Boustany NN, Tsai YC, Pfister B, Joiner WM, Oyler GA, Thakor NV, "BCL-xL-dependent light scattering by apoptotic cells," *Biophys J*, 87(6):4163-71, 2004. <http://www.ncbi.nlm.nih.gov/pubmed/15377529>
- [146] Lau W. W., Ramey N. A., Corso J. J., Thakor N. V., Hager G. D., "Stereo-based endoscopic tracking of cardiac surface deformation," *Lecture Notes Comput. Sci.*, pp. 494 to 501, 2004. [http://dx.doi.org/10.1007/978-3-540-30136-3\\_61](http://dx.doi.org/10.1007/978-3-540-30136-3_61).
- [147] Lau W, Tong S, Thakor NV, "Spatiotemporal characteristics of low-frequency functional activation measured by laser speckle imaging," *IEEE Trans Neural Syst Rehabil Eng*, 13(2):179-85, 2005. <http://www.ncbi.nlm.nih.gov/pubmed/16003897>
- [148] Moraru L, Tong S, Malhotra A, Geocadin R, Thakor N, Bezerianos A, "Investigation of the effects of ischemic preconditioning on the HRV response to transient global ischemia using linear and nonlinear methods," *Med Eng Phys*, 27(6):465-73, 2005. <http://www.ncbi.nlm.nih.gov/pubmed/15990063>
- [149] Sauer C, Stanacevic M, Cauwenberghs G, and Thakor NV, "Power Harvesting and Telemetry in CMOS for Implanted Devices," *IEEE Trans. Circuits and Systems I: Regular Papers, Special Issue on "Biomedical Circuits and Systems: A New Wave of Technology"*, 52(12):2605-2613, 2005.
- [150] Ye D, Mozaffari-Naeini H, Busart C, Thakor NV, "MEMSurgery: an integrated test-bed for vascular surgery," *Int J Med Robot*, 1(3):21-30, 2005. <http://www.ncbi.nlm.nih.gov/pubmed/17518387>
- [151] Murari K, Stanačević M, Cauwenberghs G, Thakor NV, "Integrated potentiostat for neurotransmitter sensing. A high sensitivity, wide range VLSI design and chip," *IEEE Eng Med Biol Mag*, 24(6):23-9, 2005. <http://www.ncbi.nlm.nih.gov/pubmed/16382801>
- [152] Al-Nashash HA, Thakor NV, "Monitoring of global cerebral ischemia using wavelet entropy rate of change," *IEEE Trans Biomed Eng*, 52(12):2119-22, 2005. <http://www.ncbi.nlm.nih.gov/pubmed/16370057>
- [153] Geocadin RG, Malhotra AD, Tong S, Seth A, Moriwaki G, Hanley DF, Thakor NV, "Effect of acute hypoxic preconditioning on qEEG and functional recovery after cardiac arrest in rats," *Brain Res*, 1064(1-2):146-54, 2005. <http://www.ncbi.nlm.nih.gov/pubmed/16289119>
- [154] Koenig MA, Kaplan PW, Thakor NV, "Clinical neurophysiologic monitoring and brain injury from cardiac arrest," *Neurol Clin*, 24(1):89-106, 2006. <http://www.ncbi.nlm.nih.gov/pubmed/16443132>
- [155] Koskinen M, Seppänen T, Tong S, Mustola S, Thakor NV, "Monotonicity of approximate entropy during transition from awareness to unresponsiveness due to propofol anesthetic induction," *IEEE Trans Biomed Eng*, 53(4):669-75, 2006. <http://www.ncbi.nlm.nih.gov/pubmed/16602573>
- [156] Cai Y, Qiu Y, Wei L, Zhang W, Hu S, Smith PR, Crabtree VP, Tong S, Thakor NV, Zhu Y, "Complex character analysis of heart rate variability following brain asphyxia," *Med Eng Phys*, 28(4):297-303, 2006. <http://www.ncbi.nlm.nih.gov/pubmed/16129646>
- [157] Shin HC, Tong S, Yamashita S, Jia X, Geocadin RG, Thakor NV, "Quantitative EEG and effect of hypothermia on brain recovery after cardiac arrest," *IEEE Trans Biomed Eng*, 53(6):1016-23, 2006. <http://www.ncbi.nlm.nih.gov/pubmed/16761828>

- [158] Thakor NV, Shin HC, Tong S, Geocadin RG, "Quantitative EEG assessment," IEEE Eng Med Biol Mag, 25(4):20-5, 2006. <http://www.ncbi.nlm.nih.gov/pubmed/16898654>
- [159] Zhang H, Venkatesha S, Minahan R, Sherman D, Oweis Y, Natarajan A, Thakor NV, "Intraoperative Neurological monitoring. Continuous evoked potential signal extraction and analysis," IEEE Eng Med Biol Mag, 25(4):39-45, 2006. <http://www.ncbi.nlm.nih.gov/pubmed/16898657>
- [160] Vogelstein RJ, Etienne-Cummings R, Thakor NV, Cohen AH, "Phase-dependent effects of spinal cord stimulation on locomotor activity," IEEE Trans Neural Syst Rehabil Eng, Vol. 14(3):257-65, 2006.
- [161] Vogelstein J, Tenore F, Etienne-Cummings R, Lewis MA, Thakor NV and Cohen A, "Control of Locomotion After Injury or Amputation," Biological Cybernetics, Vol. 95, No. 6, pp. 555 – 566, December 2006. <http://www.ncbi.nlm.nih.gov/pubmed/17009484>, Epub 2006 Nov 18. PMID: 17139511.
- [162] Thakor NV, Tong S, "Therapeutic technologies in neuroengineering," IEEE Eng Med Biol Mag, 25(5):30-1, 2006. <http://www.ncbi.nlm.nih.gov/pubmed/17020196>
- [163] Jia X, Koenig MA, Shin HC, Zhen G, Yamashita S, Thakor NV, Geocadin RG, "Quantitative EEG and neurological recovery with therapeutic hypothermia after asphyxial cardiac arrest in rats," Brain Res, 1111(1):166-75, 2006. <http://www.ncbi.nlm.nih.gov/pubmed/16919609>
- [164] Hong B, Acharya S, Ku Y, Gao S, Thakor NV, "Measurement of dynamic coupling of independent EEG components from cognitive tasks," Int J. Bioelectro. Mag., Vol. 8, No. 1, pp. VII/1 - VII/7, 2006. <http://www.rgi.tut.fi/ijbem/volume8/number1/htm/hong.htm>
- [165] Seppanen T, Tong S., Mustola S., Thakor NV, Seppanen T, Tong S, Thakor NV, "Monotonicity of approximate entropy during transition from awareness to unresponsiveness due to propofol anesthetic induction," IEEE Trans Biomed. Eng., Vol. 53, Issue: 4, pp. 669-675, 2006. [10.1109/TBME.2006.870230](http://www.ncbi.nlm.nih.gov/pubmed/10.1109/TBME.2006.870230)
- [166] Wuyyuru V., Zhang H., Natarajan A., Thakor N., "Myocardial ischemia detection from intracardiac paced electrogram using depolarization analysis," Heart Rhythm, Vol. 3-5, pp. S62 to S63, 2006. <http://dx.doi.org/10.1016/j.hrthm.2006.02.198>.
- [167] Tong S, Jiang D, Wang Z, Zhu Y, Geocadin RG, Thakor NV, "Long range correlations in the heart rate variability following the injury of cardiac arrest," Physica A, 380:250-258, 2007.
- [168] Murari K, Li N, Rege A, Jia X, All A, Thakor NV, "Contrast-enhanced imaging of cerebral vasculature with laser speckle," Appl Opt, 46(22):5340-6, 2007. <http://www.ncbi.nlm.nih.gov/pubmed/17676149>
- [169] Schreckinger M, Geocadin RG, Savonenko A, Yamashita S, Melnikova T, Thakor NV, Hanley DF, "Long-lasting cognitive injury in rats with apparent full gross neurological recovery after short-term cardiac arrest," Resuscitation, 75(1):105-13, 2007. <http://www.ncbi.nlm.nih.gov/pubmed/17475391>
- [170] Tong S, Li Z, Zhu Y, Thakor NV, "Describing the nonstationarity level of neurological signals based on quantifications of time-frequency representation," IEEE Trans Biomed Eng, 54(10):1780-5, 2007. <http://www.ncbi.nlm.nih.gov/pubmed/17926676>
- [171] Chatterjee A, Aggarwal V, Ramos A, Acharya S, Thakor NV, "A brain-computer interface with vibrotactile biofeedback for haptic information," J Neuroeng Rehabil, 4:40, 2007. <http://www.ncbi.nlm.nih.gov/pubmed/17941986>
- [172] Aggarwal V, Acharya S, Tenore F, Etienne-Cummings R, Schieber MH, Thakor NV, "Asynchronous Decoding of Dexterous Finger Movements using M1 Neurons," IEEE Trans Neural Syst Rehab. Eng, 16(1):3-14, 2008. <http://www.ncbi.nlm.nih.gov/pubmed/18303800> doi: 10.1109/TNSRE.2007.916289. Erratum in: IEEE Trans Neural Syst Rehabil Eng. 2008 Aug;16(4):421. PMID: 18303800.
- [173] Acharya S, Tenore F, Aggarwal V, Etienne-Cummings R, Schieber MH, Thakor NV, "Decoding individuated finger movements using volume-constrained neuronal ensembles in the M1 hand area," IEEE Trans Neural Syst Rehabil Eng, 16(1):15-23, 2008. <http://www.ncbi.nlm.nih.gov/pubmed/18303801>, doi: 10.1109/TNSRE.2007.916269. PMID: 18303801.
- [174] Jia X, Koenig MA, Shin HC, Zhen G, Pardo CA, Hanley DF, Thakor NV, Geocadin RG, "Improving neurological outcomes post-cardiac arrest in a rat model: Immediate hypothermia and quantitative EEG monitoring," Resuscitation, 76(3):431-42, 2008. <http://www.ncbi.nlm.nih.gov/pubmed/17936492>
- [175] Jia X, Koenig MA, Nickl R, Zhen G, Thakor NV, Geocadin RG, "Early electrophysiologic markers predict functional outcome associated with temperature manipulation after cardiac arrest in rats," Crit Care Med, 36(6):1909-16, 2008. <http://www.ncbi.nlm.nih.gov/pubmed/18496359>

- [176] Jia X, Koenig MA, Venkatraman A, Thakor NV, Geocadin RG, "Post-cardiac arrest temperature manipulation alters early EEG bursting in rats," *Resuscitation*, 78(3):367-73, 2008. <http://www.ncbi.nlm.nih.gov/pubmed/18597914>
- [177] Shin HC, Jia X, Nickl R, Geocadin RG, Thakor NV, "A subband-based information measure of EEG during brain injury and recovery after cardiac arrest," *IEEE Trans Biomed Eng*, 55(8):1985-90, 2008. <http://www.ncbi.nlm.nih.gov/pubmed/18632361>
- [178] All AH, Aggarwal V, Thakor NV, "Evaluation of human performance in manual blood vessel compression," *Int. J. Cardiovascular Med.Sci.*, Vol. III, No 2, pp 113-117, 2008.
- [179] Mollazadeh M, Murari K, Cauwenberghs G., and Thakor NV, "Micropower CMOS integrated low-noise amplification, filtering, and digitization of multimodal neuropotentials," *IEEE Trans. Biomed. Circuits Systems*, Vol. 3, No. 1, pp. 1-10, 2009. doi: 10.1109/TBCAS.2008.2005297. PMID: 20046962. <http://www.ncbi.nlm.nih.gov/pubmed/20046962>
- [180] All AH, Gerovichev O, Sauer C, Naware M, Thakor NV. "Haptic and visual feedback achieves minimum occlusion force in vascular surgery" *Int. J. Cardiovascular Med.Sci.*, Vol. 6, No 1, pp 17-24, 2009.
- [181] Murari K, Thakor N V, Cauwenberghs G, "Which photodiode to use: a comparison of CMOS-compatible structures," *IEEE Sensors J.*, vol. 9, no. 7, pp. 752–760, 2009. <http://www.ncbi.nlm.nih.gov/pubmed/20454596>.
- [182] Tenore F., Ramos A., Acharya S., Etienne-Cummings R. and Thakor N. V., "Decoding of individuated finger movements using surface electromyography," *IEEE Trans. Biomed. Eng.*, Vol. 56(5), pp. 1427-1434, 2009. <http://www.ncbi.nlm.nih.gov/pubmed/19473933>, PMID: 19473933.
- [183] Li N, Jia X, Murari K, Parlapalli R, Rege A, Thakor NV, "High spatiotemporal resolution imaging of the neurovascular response to electrical stimulation of rat peripheral trigeminal nerve as revealed by in vivo temporal laser speckle contrast," *J Neurosci Methods*, Vol. 176, pp. 230-236, 2009. <http://www.ncbi.nlm.nih.gov/pubmed/18706442>
- [184] Kang X, Geocadin R, Thakor NV, Maybhate A, "Multiscale entropy analysis of EEG for assessment of post-cardiac-arrest neurological recovery under hypothermia in rats," *IEEE Trans. Biomed. Eng.*, Vol. 56(4), pp. 1023-1031, 2009. <http://www.ncbi.nlm.nih.gov/pubmed/19174339>
- [185] Koenig M. A., Jia X, Kang X, Velasquez A, Thakor NV, and Geocadin RG, "Intraventricular Orexin-A improves arousal and early EEG entropy in rats after cardiac arrest," *Brain Res*, Vol. 1255, pp.153-161, 2009. <http://www.ncbi.nlm.nih.gov/pubmed/19174339>
- [186] Shin H-C, Aggarwal V., Acharya S., Scheiber MH, and Thakor N. V., "Neural decoding of finger movements using Skellam based maximum likelihood decoding," *IEEE Trans. Biomed. Eng.*, Vol. 57(3), pp. 754-60, 2009. <http://www.ncbi.nlm.nih.gov/pubmed/19403361>
- [187] All A H, Walczak P, Agrawal G, Gorelik 2,4, Lee MC, Thakor NV, Bulte JWM, and Kerr DA, "Effect of MOG sensitization on somatosensory evoked potential in Lewis rats," *J. Neurol. Sci.*, Vol. 284, Issues 1-2, pp, 81-89, 2009. doi: 10.1016/j.jns.2009.04.025.
- [188] Yang IH, Siddique R, Hosmane S, Thakor NV, and Höke A, "Compartmentalized microfluidic culture platform to study mechanism of paclitaxel-induced axonal degeneration," *Expt. Neurol.*, Vol. 218(1), pp. 124-128, 2009. <http://www.ncbi.nlm.nih.gov/pubmed/19409381>, doi: 10.1016/j.expneurol.2009.04.017. Epub 2009 May 3. PMID:19409381.
- [189] Al Nashash H, Fatooh NA, Mirza NM, Ahmed R, Agrawal G, Thakor NV and All AH, "Spinal cord injury detection and monitoring using spectral coherence", *IEEE Trans Biomed Eng.*, Vol. 56(8):1971-9. Epub 2009 Apr 7. <http://www.ncbi.nlm.nih.gov/pubmed/19362907>
- [190] All AH, Walczak P, Agrawal G, Lee C, Thakor NV, Bulte JWM and Kerr DA, "Effect of MOG sensitization on somatosensory evoked potential in Lewis rats," *J. Neurological Sci.*, Vol. 284(1-2):8 1-9. Epub 2009 May 6. <http://www.ncbi.nlm.nih.gov/pubmed/19423134>
- [191] Agrawal G, Thakor NV, and All AH, "Evoked Potential versus behavior to detect minor insult to spinal cord in rat model," *J. Clin. Neurosci.*, Vol. 16(8), pp.1052-1055. 2009. <http://www.ncbi.nlm.nih.gov/pubmed/19419872>
- [192] Agarwal G, Kerr C, Thakor N V and All A, "Characterization of graded MASCIS contusion spinal cord injury using somatosensory evoked potential" *Spine*, Mar 27, 2010. <http://www.ncbi.nlm.nih.gov/pubmed/19419872>

- [193] Singhal G, Aggarwal V, Acharya S, Aguayo J, He J, Thakor NV, " Ensemble fractional sensitivity: a quantitative approach to neuron selection for decoding motor tasks," Comput. Intell. Neurosci., Vol. 2010 (2010), Article ID 648202, 9 pages, doi:10.1155/2010/648202.  
<http://www.ncbi.nlm.nih.gov/pubmed/2020169103>
- [194] Hosmane S, Yang IH, Ruffin A, Thakor N, Venkatesan A., "Circular compartmentalized microfluidic platform: Study of axon-glia interactions," Lab Chip, Vol. 10(6), pp. 741-747, 2010.  
<http://www.ncbi.nlm.nih.gov/pubmed/20221562>, doi: 10.1039/b918640a. Epub 2010 Jan 5, PMID: 20221562
- [195] Letzen BS, Liu C, Thakor NV, Gearhart JD, All AH and Kerr CL, "MicroRNA expression profiling of oligodendrocyte differentiation from human embryonic stem cells", PLoS ONE, 2010 May 5;5(5):e10480. <http://www.ncbi.nlm.nih.gov/pubmed/20463920>
- [196] Agrawal G, Sherman DL, Maybhate A, Gorelik M, Kerr DA, Thakor NV, and All AH, "Slope analysis of somatosensory evoked potentials in spinal cord injury: Detecting contusion injury or focal demyelination (EAE)," J. Clinical Neurosci., 2010 Sep;17(9):1159-64. Epub 2010 Jun 9.  
<http://www.ncbi.nlm.nih.gov/pubmed/20538464>
- [197] Kerr C, Letzen BS, Hill C, Agrawal G, Thakor NV, Sternecker J, Gearhart J and All AH, "Efficient differentiation of human embryonic stem cells into oligodendrocyte progenitors for application in a rat contusion model of spinal cord injury," Int. J. Neurosci., Vol. 120(4), pp. 305-313, 2010.  
<http://www.ncbi.nlm.nih.gov/pubmed/20374080>
- [198] Berger TW, Chen Z, Cichocki A, Oweiss KG, Quiroga RQ and Thakor NV, " Signal processing for neural spike trains," Editorial, Computational Intelligence and Neurosci., Vol. 2010, Article ID 698751, 2 pages, doi:10.1155/2010/698751.
- [199] Xiong W, Koenig M, Madhok J, Jia X, Puttgen HA, Thakor NV, and Geocadin RG, "Evolution of somatosensory evoked potentials after cardiac arrest induced hypoxic-ischemic injury," Resuscitation, Vol. 81(7):893-897, 2010. Epub 2010 Apr 24. <http://www.ncbi.nlm.nih.gov/pubmed/20418008>
- [200] Choi Y, Koenig MA, Jia X, and Thakor NV, "Quantifying time-varying multiunit neural activity using entropy based measures," IEEE Tran. Biomed. Eng., Vol. 57, pp. 2771 – 2777, 2010.  
<http://www.ncbi.nlm.nih.gov/pubmed/20460201> doi: [10.1109/TBME.2010.2049266](https://doi.org/10.1109/TBME.2010.2049266)
- [201] Madhok J, Maybhate A, Xiong W, Koenig MA, Geocadin, RG, Jia X, Thakor NV, "Quantitative assessment of somatosensory evoked potentials after cardiac arrest in rats: prognostication of functional outcomes" Critical Care Med., Vol. 38(8), pp. 1709-1717, 2010.  
<http://www.ncbi.nlm.nih.gov/pubmed/20526197>
- [202] Acharya S., Fifer MS, Benz HL, Crone NE, and Thakor NV, "Electrocorticographic amplitude predicts finger positions during slow grasping motions of the hand," J Neural Eng., Vol. 7(4), 2010. doi: [10.1088/1741-2560/7/4/046002](https://doi.org/10.1088/1741-2560/7/4/046002), <http://www.ncbi.nlm.nih.gov/pubmed/20489239>
- [203] All AH, Agrawal G, Walczak P, Maybhate A, Bulte JW, Kerr DA, "Evoked potential and behavioral outcomes for experimental autoimmune encephalomyelitis (EAE) in Lewis rats, " Neurol Sci., Vol. 7(4):046002, 2010. Epub 2010 May 20. <http://www.ncbi.nlm.nih.gov/pubmed/20508959>
- [204] Miao P., Li M., Li N., Rege A., Yisheng Z., Thakor N., Tong S., "Detecting cerebral arteries and veins: from large to small," J. Innovative Optical Health Sci., Vol. 03 (01), pp. 61-67, 2010.  
<http://dx.doi.org/10.1142/s1793545810000794> .
- [205] Wu W., Guo X, Jiang D., Sun J., Qiu Y., Zhu Y., Thakor N. V., Tong S., "Influence of hypoxic-preconditioning on autonomic regulation following global ischemic brain injury in rats," Neurosci. Letters, Vol. 480 (3), pp. 191-195, 2010. <http://dx.doi.org/10.1016/j.neulet.2010.06.029>.
- [206] Hur EM, Yang IH, Kim DH, Byun J, Xu WL, Saijilafu S, Nicovich P, Cheong R, Levchenko A, Thakor NV, Zhou FQ, "Inhibition of nonmuscle myosin II promotes axon growth over inhibitory molecules by regulating growth cone dynamics and microtubule structures " Proc. Natl. Acad. Sci., doi:10.1073/pnas.1011258108, pp. 1-6, 2011. PMID: 21383151.
- [207] Greenwald E, Mollazadeh M, Hu C, Tang W, Culurciello E, and Thakor NV, "A VLSI Neural Monitoring system with ultra-wideband telemetry for awake behaving subjects," IEEE Trans. Biomed. Circuits. Systems, Vol. 5 (2), IEEE Trans Biomed Circuits Syst., pp. 112-119, 2011, doi: 10.1109/TBCAS.2011.2141670, PMID: 23851199.
- [208] Li N, Downey J, Bar-Shir A, Gilad A A, Walczak P, Kim H, Joel S E, Pekar J J, Thakor N V and Pelled G., "Optogenetically-guided cortical plasticity following nerve injury," Proc. Natl. Acad. Sci.,



Vol. 108(21):8838-43, May 24, 2011. doi: 10.1073/pnas.1100815108. Epub 2011 May 9. PMID: 21555573.

- [209] Wu D, Anastassios B, Xiong W, Madhok J, Jia X, Thakor NV, "Study of the origin of short- and long-latency SSEP during recovery from brain ischemia in a rat model," Neurosci Lett, Vol. 13, 2010 Sep 13. <http://www.ncbi.nlm.nih.gov/pubmed/20816917>.
- [210] Sherman DL, Zhang N, Garg S, Thakor NV, Mirksi MA, White MA, Hinich MJ, "Detection of nonlinear interactions of EEG Alpha waves in the brain by a new coherence measure and its application to epilepsy," Int. J. Neural Systems, Vol. 21, No. 2, pp. 115-126, 2011. DOI: 10.1142/S0129065711002754
- [211] Ziegler L, Grigoryan S, Yang IH, Thakor NV, Goldstein RS., "Efficient generation of Schwann cells from human embryonic stem cell-derived neurospheres," Stem Cell Rev. Vol. 7(2), pp. 394-403, 2011. doi: 10.1007/s12015-010-9198-2. PMID: 21052870.
- [212] Markus A, Grigoryan S, Sloutskin A, Yee MB, Zhu H, Yang IH, Thakor NV, Sarid R, Kinchington PR, and Goldstein RS, "Varicella zoster virus infection of neurons derived from human embryonic stem cells: direct demonstration of axonal infection, transport of VZV and productive neuronal infection," J. Virol., Vol. 85(13), pp. 6220-6233, 2011.
- [213] Ma Y, Hu Y, Valentin N, Geocadin RG, Thakor NV, Jia X, "Time jitter of somatosensory evoked potentials in recovery from hypoxic-ischemic brain injury," J. Neurosci. Methods, Vol. 201, pp. 355-360, 2011.
- [214] Mollazadeh M., Greenwald E., Thakor N. V., Schieber M., Cauwenberghs G., "Wireless micro-ECoG recording in primates during reach-to-grasp movements," IEEE BioCAS, pp. 237-240, 10 Nov 2011. PMID:23853286.
- [215] Chaerkady R, Letzen B, Renuse S, Sahasrabudhe NA, Kumar P, All AH, Thakor NV, Delanghe B, Gearhart JD, Pandey A, Kerr CL., "Quantitative temporal proteomic analysis of human embryonic stem cell differentiation into oligodendrocyte progenitor cells," Proteomics, Jul 19, Vol. 11, pp. 1-14, 2011. doi:10.1002/pmic.201100107 |
- [216] Murari K, Etienne Cummings R, Thakor NV, and Cauwenberghs G, "A CMOS in-pixel CTIA high sensitivity fluorescence imager", IEEE Trans. Biomed. Circ. and Sys., Vol. 5 (5), pp. 449 - 458, Oct 2011. 10.1109/TBCAS.2011.2114660.
- [217] Hosmane S, Fournier A, Wright R, Rajbhandari L, Siddique R, Yang IH, Ramesh KT, Venkatesan A and Thakor NV, "Valve-based microfluidic compression platform: single axon injury and regrowth," Lab Chip, Vol. 11 (22) pp. 3888-3895, 2011. DOI: 10.1039/C1LC20549H, Epub 2011 Oct 6., PMID: 21975691.
- [218] Mollazadeh M, Aggarwal V, Davidson AG, Law AJ, Thakor NV and Schieber MH, "Spatiotemporal variation of multi-modal neural activity in the primary motor cortex during dexterous reach-to-grasp movements," J. Neurosci., Vol. 31(43), pp. 15531-15543, 2011. doi: 10.1523/JNEUROSCI.2999-11.2011. PMID: 22031899.
- [219] Maybhate A, Hu C, Bazley FA, Yu Q, Thakor NV, Kerr CL, and All AH, "Potential long-term benefits of acute hypothermia after spinal cord injury: Assessments with somatosensory-evoked potentials," Crit. Care Med., Vol. 40, No. 2, pp. 573-579, 2012. doi: 10.1097/CCM.0b013e318232d97e.
- [220] Fifer MS, Acharya S, Benz HL, Mollazadeh M, Crone NE, Thakor NV, "Toward Electrographic control of a dexterous upper limb prosthesis: Building brain-machine interfaces," IEEE Pulse, Vol. 3(1), pp. 38-42, Jan 2012. doi: 10.1109/MPUL.2011.2175636. Review. PMID: 22344950.
- [221] Andersen RA, Schieber MH, Thakor NV, Loeb GE, "Natural and Accelerated Recovery from Brain Damage: Experimental and Theoretical Approaches" IEEE Pulse, pp 61-65, Mar 2012
- [222] Bazley FA, Hu C, Maybhate A, Pourmorteza A, Pashai N, Thakor NV, Kerr C, All AH, "Electrophysiological evaluation of sensory and motor pathways after incomplete unilateral spinal cord contusion". J. Neurosurgery: Spine, Apr;16(4):414-23. Epub 2012 Feb 3, 2012.
- [223] Rege A, Thakor NV, Rhie K, and Pathak AP, "In vivo laser speckle contrast imaging reveals microvascular remodeling and hemodynamic changes during wound healing angiogenesis," Angiogenesis, Vol. 15(1), pp. 87-98, 2012. PMID: 22198198.
- [224] Benz HL, Zhang H, Bezerianos A, Acharya S, Crone NE, Zheng X, and Thakor NV, "Connectivity analysis as a novel approach to motor decoding for prosthesis control," IEEE Trans. Neural Systems Rehab. Eng., 20(2), pp. 143-152, 2012.

- [225] Kim H-N, Kim Y-H, Shin H-C, Aggarwal V, Schieber MH, and Thakor NV, "Neuron selection by relative importance for neural decoding of dexterous finger prosthesis control application," Biomed. Signal Proc. Control, Vol. 7 (2012) 632–639, 2012.
- [226] Rege A, Senarathna J, Li N, and Thakor NV, "Anisotropic processing of laser speckle images improves spatiotemporal resolution," IEEE Trans. Biomed. Eng., vol. 59(5), pp.1272-1280, 2012. doi: 10.1109/TBME.2012.2183675. Epub 2012 Jan 10.
- [227] Rege A, Murari K, Seifert A, Thakor NV, "Multiexposure laser speckle contrast imaging of the angiogenic environment," J. Biomed. Optics, Vol. 16(5): pp. 601-610, 2012. PMID: 3124539.
- [228] Lalitha A, Thakor NV, "Design of an accelerometer-controlled myoelectric human computer interface" Advanced Materials Research, Vol. 403, pp. 3973-3979, 09 Feb 2012.
- [229] Wu D, Xiong W, Jia X., Geocadin R., Thakor N. V. "Short-and long-latency somatosensory neuronal responses reveal selective brain injury and effect of hypothermia in global hypoxic ischemia" Am Physiol Soc, Vol. 107(4), pp 1164-1171, 15 Feb 2012.
- [230] Chang Y-J., Liao L-D., Lin C-T., Lai H-Y., Chen J-L., Yang Y-T., Ting Y-C., Huang Y-P., Wu, R., Thakor N. V., Chen Y-Y., "A low-cost multi-electrode array system for the simultaneous acquisition of electrophysiological signal and cellular morphology," J. Neurosci. Neuroeng., pp. 131-142, Vol. 1 (2), 2012. <http://dx.doi.org/10.1166/jnsne.2012.1025>.
- [231] Yang I. H., Gary D., Malone M., Dria S., Houdayer T., Belegu V., Mcdonald J., and Thakor N. V., "Axon myelination and electrical stimulation in a microfluidic, compartmentalized cell culture platform," NeuroMolecular Med., Vol. 14(2), pp. 112-118, 2012. doi: 10.1007/s12017-012-8170-5. Epub 2012 Apr 13. PMID: 22527791.
- [232] Hosmane S, Tegenge MA, Rajbhandari L, Uapinyoying P, Kumar NG, Thakor NV, Venkatesan A, "Toll/Interleukin-1 Receptor Domain-Containing Adapter Inducing Interferon- $\beta$  Mediates Microglial Phagocytosis of Degenerating Axons" J. Neurosci., 32(22), pp. 7745-7757, 30 May 2012.
- [233] Saxena S, Schieber MH, Thakor NV, and Sarma SV, "Aggregate input output models of neuronal populations," IEEE Trans. Biomed. Eng., pp. 2030-2039, Jul 2012. PMID: 22552544
- [234] Zhang H, Benz HL, Thakor NV, and Bezerianos A, "Connectivity mapping of human brain by phase-based evolution map approach," Int. J. Bifurc. Chaos, Vol. 22 (9), 2012. doi: 10.1142/S0218127412502252, <http://dx.doi.org/10.1142/S0218127412502252>.
- [235] Rege A\*, Senarathna J\*, Li N, Thakor N. V., "Anisotropic processing of laser speckle images improves spatiotemporal resolution", IEEE Trans Biomed Engr vol. 59, no. 5, pp. 1272-128, 2012. (\*equal contributions).
- [236] Rege A, Seifert AC, Schlattman D, Ouyang Y, Li K, Basaldella L, Brem H, Tyler B and Thakor NV, "Longitudinal in vivo monitoring of rodent glioma models through thinned skull using laser speckle contrast imaging," J. Biomed. Optics, Vol.17(12), 126017, Dec. 2012. doi:10.1117/1.JBO.17.12.126017.
- [237] Rege A, Thakor NV, and Pathak AP, "Optical imaging of microvascular morphology and perfusion," Current Angiogenesis, Vol. 1, pp. 243-260, 2012.
- [238] Madhok J, Wu D, Xiong W, Geocadin RG, Jia X, "Hypothermia amplifies somatosensory evoked potentials in uninjured rats," J. Neurosurg. Anesthesiol. Vol. 24, no. 3, pp. 197-202, 2012.
- [239] Kortelainen J, Jia X, Seppänen T, Thakor NV, "Increased Electroencephalographic gamma activity Reveals Awakening from Isoflurane anaesthesia in Rats," British J. Anaesth., vol. 109, pp. 782-789, Nov 2012.
- [240] Santaniello S, Sherman D, Thakor N, Eskandar E, Sarma S. V., "Optimal control-based Bayesian Detection of cand behavioral state transitions," IEEE Trans Neural Syst. Rehabil Eng., 2012 Sep;20(5):708-19, 2012. Epub 2012 Aug 8. PMID: 22893447.
- [241] Senarathna J, Murari K, Etienne-Cummings R, Thakor NV., "A miniaturized platform for laser speckle contrast imaging," IEEE Trans Biomed Circuits Syst., Vol. 6(5), pp. 437-445, 2012. doi: 10.1109/TBCAS.2012.2218106.
- [242] Powell MA and Thakor NV, "A training strategy for learning pattern recognition control for myoelectric prostheses," J. Prosthetics Orthotics, Vol. 25 , No. 1, pp. 30-41, 2013. PMID: 23459166.
- [243] Liao L-D, Tsytsarev V., Delgado-Martínez I., Li M-L, Erzurumlu R., Lin Y-R, Vipin A., Lai H-Y, Chen Y-Y, Thakor N. V., "Neurovascular coupling: in vivo optical techniques for functional brain imaging," BioMed Eng Online, 12:38, 2013. PMID: 23631798

- [244] Siddique R, and Thakor N. V., "Investigation of nerve injury through microfluidic devices," J. Royal Soc. Interface., (invited), 13 November 2013. DOI: 10.1098/rsif.2013.0676.
- [245] Malone M, Gary D, Yang IH, Miglioretti A, Houdayer T, Thakor N, McDonald J., "Neuronal activity promotes myelination via a cAMP pathway," Glia, Vol. 61(6), pp. 843-54, 2013. doi: 10.1002/glia.22476. Epub 2013 Mar 28. PMID: 23554117.
- [246] Nag S, Jia X, Thakor NV, and Sharma D, "Flexible charge balanced stimulator with 5.6 fC accuracy for 140 nC injections," IEEE Trans. Biomedical Circuits Systems, Vol. 7, pp. 266-275, 2013. 10.1109/TBCAS.2012.2205574.
- [247] Senarathna J, Rege A, Li N, and Thakor NV, "Laser speckle contrast imaging: theory, instrumentation and applications," IEEE Rev. Biomed. Eng., Vol. 6, pp. 99-110, Jan 2013. doi: 10.1109/RBME.2013.2243140.
- [248] Aggarwal V, Mollazadeh M, Davidson A, Schieber M, and Thakor NV, "State-Based decoding of hand and finger kinematics using neuronal ensemble and LFP activity during Dexterous Reach-to-Grasp Movements" J. Neurophysiol., Vol. 109(12), pp. 3067-3081, 2013. doi: 10.1152/jn.01038.2011.. doi: 10.1152/jn.01038.2011. PMID: 23536714
- [249] Powell MA, Kaliki R, and Thakor NV, "User training for pattern recognition-based myoelectric prostheses: Improving phantom limb movement consistency and distinguishability," PMID: 24122566. May;22(3):522-32, 2014. doi: 10.1109/TNSRE.2013.2279737. Epub 2013 Oct 7. PMID: 24122566
- [250] Liao L.-D., Orellana J., Liu Y.-H., Lin Y.-R., Vipin A., Thakor N., Shen K., Wilder-Smith E., "Temperature dependent hemodynamics in rat sciatic nerve," 12:120, BioMedical Engineering OnLine, 2013.
- [251] Chen C., Maybhate A., Israel D., Thakor N. V., and Jia X., "Granger causality analysis for assessment of thalamocortical functional connectivity," IEEE Trans Neural Syst Rehabil Eng. Vol. 21(5), pp. 725-733, 2013. doi: 10.1109/TNSRE.2013.2271246. Epub 2013 Jul 10. PMID: 23864221
- [252] McClenathan B. M., Thakor N. V., Hoesch R. E., "Pathophysiology of acute coma and disorders of consciousness: considerations for diagnosis and management," Semin. Neurol., Vol. 33(02), pp. 091-109, 2013. DOI: 10.1055/s-0033-1348964.
- [253] Thakor N. V., "Translating the brain-machine interface," Sci. Transl. Med., Vol. 6 November, Vol. 5, Issue 210, p. 210ps17, 2013. DOI: 10.1126/scitranslmed.3007303.
- [254] Fifer M.S., Hotson G., Wester B.A., McMullen D.P., Wang Y., Johannes M.S., Katyal K.D., Helder J.B., Para M.P., Vogelstein R.J., Anderson W.S., Thakor N.V., Crone N.E., "Simultaneous neural control of simple reaching and grasping with the modular prosthetic limb using intracranial EEG," IEEE Trans Neural Syst Rehabil Eng. Vol. 22(3), pp. 695-705, 2014. doi: 10.1109/TNSRE.2013.2286955. Epub 2013 Oct 24. PMID: 24235276.
- [255] McMullen D., Hotson G., Katyal K., Wester B., Fifer M., McGee T., Harris A., Johannes M., Vogelstein R.J., Ravitz A., Anderson W., Thakor N., Crone N., "Demonstration of a semi-autonomous hybrid brain-machine interface using human intracranial EEG, eye tracking, and computer vision to control a robotic upper limb prosthetic," IEEE Trans. Neural Systems Rehabilitation Eng., 2014. doi: 10.1109/TNSRE.2013.2294685. Epub 2013 Dec 12., PMID: 24760914.
- [256] Tsytsarev V., Liao L.-D., Kong K. V., Liu Y.-H., Erzurumlu R. E., Olivio M., and Thakor N. V., "Recent progress in voltage-sensitive dye imaging for neuroscience," J. Nanosci. Nanotech., Vol. 14, pp. 4733-4744, 2014.
- [257] Xiang Z., Yen Y.-S., Xue N., Sun T., Tsang W. M., Zhang S., Liao L.-D., Thakor N. V. and Lee C., "Ultra-thin flexible polyimide neural probe embedded in a dissolvable maltose-coated microneedle," J. Micromech. Microeng., vol. 24, pp. 065015, 2014. doi:10.1088/0960-1317/24/6/065015.
- [258] Li N., van Zijl P., Thakor N. V., and Pelled G., "Study of the spatial correlation between neuronal activity and BOLD fMRI responses evoked by sensory and channelrhodopsin-2 stimulation in the rat somatosensory cortex," J. Mol. Neurosci., Vol. 53, Issue 4, pp 553-561, 2014. doi: 10.1007/s12031-013-0221-3. Epub 2014 Jan 19, PMID: 24443233.
- [259] Liu J., Geng J., Liao L.-D., Thakor N., Gao X., Bin L., "Conjugated polymer nanoparticles for Photoacoustic vascular imaging," Polymer Chem., Vol.5, pp. 2854-2862, 2014.
- [260] Kong K. V., Liao L.-D., Lam Z., Thakor N. V., Leong W. K., and Olivio M., "Organometallic carbonyl clusters: a new class of contrast agents for photoacoustic cerebral vascular imaging," Chem. Commun., Vol. 50, pp. 2601-2603, 2014.

- [261] Liu J., Geng J., Liao L.-D., Thakor N., Gao X., Bin L., "Conjugated polymer Nanoparticles for Photoacoustic Vascular Imaging," Polymer Chem., Vol.5, pp. 2854-2862, 2014.
- [262] Sheng Y., Liao L.-D., Thakor N. V., M. C. Tan, "Nanoparticles for molecular imaging," J. Biomed. Nanotech., Vol. 10, pp. 2642-2676, 2014. doi: 10.1166/jbn.2014.1937.
- [263] Bazley F. A., Maybhate A., Seng T. C., Thakor, N. V., Kerr C., and All A. H., "Enhancement of ipsilateral cortical somatosensory evoked potentials following thoracic contusion spinal cord injury in rats," IEEE Trans. Neural Systems Rehab Eng. DOI:10.1109/TNSRE.2014.2319313, 2014.
- [264] Sun Y., Lim J., Meng J., Kenneth K., Ph.D., Thakor N., Bezerianos A., "Discriminative analysis of brain functional connectivity patterns for mental fatigue classification," Annals Biomed. Eng., Vol. 42, Issue 10, pp 2084-2094, 2014.
- [265] Liao L.-D., Bandla A., Ling J. M., Liu Y.-H., Kuo L.-W., Chen Y.-Y., King N. KK, Lai Y.-H., Lin Y.-R., and Thakor N. V., "Improving neurovascular outcomes with bilateral forepaw stimulation in a rat photothrombotic ischemic stroke model," Neurophoton. 1(1), 011007, Jun 19, 2014. doi:10.1117/1.NPh.1.1.011007.
- [266] Yan Y., Ng L. F., Gruber J., Bettiol A. A., Thakor N. V., "Continuous Flow *C. elegans* sorting system with integrated optical fiber detection and laminar flow switching," Lab Chip, 21;14(20):4000-6, 2014. doi: 10.1039/c4lc00494a.
- [267] Geng<sup>†</sup>J., Liao<sup>†</sup>L.-D., Qin W., Tang B., Thakor N., Bin L., "An effective strategy to improve photoacoustic contrast of a fluorophore through introducing molecular rotation," Accepted, J.Nanosci. Nanotech., 2014.
- [268] Liao L., Tsytsarev V., Kong K. V., Olivo M., Erzurumlu R. S. and Thakor N., "Progress of the voltage-sensitive dye imaging in neuroscience," Vol. 14, 01-12, J. Nanoscience Nanotech., 2014. [+contributed equally]
- [269] Shang Y, Liao Lun-De, Thakor N. and Tan M. C., "Rare earth doped particles as dual-modality contrast agent for minimally invasive luminescence and dual wavelength photo-acoustic imaging," Sci. Reports, Vol. 4: 6562, doi: 10.1038/srep06562, 2014.
- [270] Yong-Hee Kim Y.-H., Thakor N. V., and Kim H.-N., "Neuron selection based on deflection coefficient maximization for the neural decoding of dexterous finger movements," IEEE Trans. Neural Systems Rehab. Eng., Vol. 23(3), pp. 374 – 384, 2014. 10.1109/TNSRE.2014.2363193.
- [271] Ma J., Thakor N. V., and Fumitoshi M., "Hand and wrist movement control of myoelectric prosthesis based on synergy," IEEE Trans. Human Machine System, 2014. doi: 10.1109/THMS.2014.2358634, <http://ieeexplore.ieee.org/xpl/articleDetails.jsp?arnumber=6982229>.
- [272] Hotson G., Fifer M. S., Acharya S., Benz H. L., Anderson W. S., Thakor N. V., and Crone N. E., "Coarse electrocorticographic decoding of ipsilateral reach in patients with brain lesions." PLOS One, December 29, 2014. DOI: 10.1371/journal.pone.0115236. PMID: 25545500.
- [273] Mollazadeh M, Aggarwal V, Thakor NV, Schieber MH., "Principal components of hand kinematics and neurophysiological signals in motor cortex during reach to grasp movements.," J Neurophysiol., Vol. 112(8), pp. 1857-70. 2014, doi: 10.1152/jn.00481.2013. Epub 2014 Jul 2., PMID: 24990564.
- [274] Kang X, Sarma SV, Santaniello S., Schieber M, Thakor N. V., "Task-independent cognitive state transition detection from cortical neurons during 3-D reach-to-grasp movements.," IEEE Trans Neural Syst Rehabil Eng., Jul;23(4):676-82, 2015. doi: 10.1109/TNSRE.2015.2396495. Epub 2015 Jan 27.
- [275] Lee S., Yen S.-C., Sheshadri S., Martinez D., Xue N., Xiang Z., Thakor N., Lee C., "Flexible epineural strip electrode (FLESE) for recording in fine nerves," IEEE Transactions on Biomedical Engineering, Aug 2015. 10.1109/TBME.2015.2466442.
- [276] Nag S., Sharma D., Thakor N. V., "Sensing of stimulus artifact suppressed signals from electrode interfaces," IEEE Sensors J., pp. 3734 – 3742, Feb., 2015. DOI: 10.1109/JSEN.2015.2399248.
- [277] Yuan Y.,<sup>†</sup> Wang Z.,<sup>‡</sup> Cai P.,<sup>#</sup> Liu J.,<sup>†</sup> Liao L.-D.,<sup>±</sup> Hong M.,<sup>‡</sup> Chen X.,<sup>#</sup> Thakor N.,<sup>±</sup> and Bin L.<sup>\*,†,§</sup>, "Conjugated polymer and drug co-encapsulated nanoparticles for photothermal combined chemotherapy with two-photon regulated fast drug release" Nanoscale, ID: NR-ART-10-2014-006420.
- [278] M. Guo, G. Xu, L. Wang, M. Masters, G. Milsap, N. Thakor, A. B. Soares, "The anterior contralateral response improves performance in a single trial auditory oddball BMI," Biomed. Sig. Proc. Control, vol. 22, pp. 74-84, 2015.
- [279] P Miao, Z Chao, S Feng, H Yu, Y Ji, N Li, NV Thakor, "Local scattering property scales flow speed estimation in laser speckle contrast imaging," Laser Physics Letters 12 (7), 075601, 2015.

- [280] Bandla A., Sundar R., Liao L.-D., Tan S.S.H., Lee S.-C., Thakor N. V., and Wilder-Smith E. P. V., "Hypothermia for preventing chemotherapy-induced neuropathy a pilot study on safety and tolerability in healthy controls," *Acta Oncologica*, ISSN: 0284-186X (Print) 1651-226X (Online), 2015. DOI: 10.3109/0284186X.2015.1075664
- [281] Vilarino M., Moon J., Rogner Pool K., Varghese J., Ryan T., Thakor N., and Kaliki R., "Outcomes and perception of a conventional and alternative myoelectric control strategy: A study of experienced and new multi-articulating hand users," *J. Prosthetics Orthotics*, Vol. 27(2), pp. 53–62, 2015. doi: 10.1097/JPO.0000000000000055.
- [282] Vipin A, Kortelainen J, Al-Nashash H, Chua S M, Thow X, Manivannan J, Astrid, Thakor N V., Kerr C L., and All A H., "Therapeutic hypothermia and temperature management. 5(3): 152-162, September 2015, doi:10.1089/ther.2015.0005.
- [283] Orchard G., Etienne-Cummings R., Thakor N. V., Benosman R., "H-First: A temporal approach to object recognition," *IEEE Trans. Pattern Recog. Machine Intell.*, Vol. 37(10), pp. 2028 – 2040, 2015. 10.1109/TPAMI.2015.2392947.
- [284] Kahn K., Saxena S., Eskander E., Thakor N., Schieber M., Gale J. T., Averbek B., Eden M. and Sarma S., "Systematic approach to selecting task relevant neurons," *J. Neurosci. Methods.*, Vol. 245, , Pages 156–168, 30 April 2015.
- [285] Agarwal R., Thakor N., Sarma S. and Massaiquoi S., "PMv neuronal firing may be driven by a movement command trajectory within multidimensional Gaussian fields" *J. Neurosci.*, Vol. 35(25): pp. 9508-9525; 24 June 2015. doi: 10.1523/JNEUROSCI.2643-14.2015
- [286] Yu K., Bodala, Indu; Mir, Hasan; Thakor, Nitish; Al-Nashash, Hasan "Cognitive workload modulation through degraded visual stimuli: a single-trial EEG study" *J. Neural Eng.*, 12 (2015) 046020, 2015. doi:10.1088/1741-2560/12/4/046020.
- [287] Jegadeesan R., Nag S., Agarwal K., Thakor N. V. and Guo Y. X., "Enabling wireless powering and telemetry for neural implants," *IEEE J. Bio. Health Informatics*, Vol. 19 (3), pp. 958-970, 2015.
- [288] Y.-H. Liu, Stacey S. H.Tan, K. Y. Kwon, J. M. Ling, A. Bandla, Y.-Y. I. Shih, E. Tan, W. Li, W. H. Ng, H.-Y. Lai, Y.-Y. Chen, N. V. Thakor, L.-D. Liao "Assessment of neurovascular dynamics during transient ischemic attack by the novel integration of micro-electrocorticography electrode array with functional photoacoustic microscopy, *Neurobol. Disease.*, Vol. 82, pp. 455–465, October 2015. doi:10.1016/j.nbd.2015.06.019.
- [289] Sun Y. and Thakor N. V., "Photoplethysmography revisited: from contact tononcontact, from point to imaging," *IEEE Trans. Biomed. Eng.*, Vol. pp, Issue 99, 2015. 10.1109/TBME.2015.2476337.
- [290] Edelman B., Johnson N., Sohrabpour A., Tong S., Thakor N., He B., "Systems neuroengineering: Understanding and interacting with the brain," *Engineering*, Vol. 1(3), pp. 292 -308, 2015. DOI: 10.15302/J-ENG-2015078
- [291] Lahiri A., Delgado I. M., Sheshadri S., Ng K., Nag S., Yen S.-C., Thakor N. V., "Self-organization of 'fibro-axonal' composite tissue around unmodified metallic microelectrodes can form a functioning interface with a peripheral nerve: A new direction for creating long-term neural interfaces," *Muscle Nerve.*, Oct 1, 2015 doi: 10.1002/mus.24928. PMID: 26425938
- [292] Orchard G., Jayawant A., Cohen G. K., Thakor N., "Converting static image datasets to spiking neuromorphic datasets using saccades," *Frontiers of Neurosci.: Neuromorphic Eng.*, Nov. 2016. | doi: 10.3389/fnins.2015.00437.
- [293] Borghini G., Arico P., Graziani I., Salinari S., Sun Y., Taya F., Bezerianos A., Thakor N.V., and Babiloni F., "Quantitative assessment of the training improvement in a motor-cognitive task by using eeg, ecg and eog signals," *Brain Topography*, pp. 1–13, 2015.
- [294] Zeming KK, Thakor NV, Zhang Y, Chen CH, "Real-time modulated nanoparticle separation with an ultra-large dynamic range," *Lab Chip*, 2015 Nov 17. PMID: 26575003 [Epub ahead of print].
- [295] Xiang Z, Yen SC, Sheshadri S, Wang J, Lee S, Liu YH, Liao LD, Thakor NV, Lee C, "Progress of Flexible Electronics in Neural Interfacing - A Self-adaptive non-invasive neural ribbon electrode for small nerves recording," *Adv Mater.*, 2015 Nov 16. doi: 10.1002/adma.201503423.
- [296] Dimitriadis S., Sun Y., Laskaris N., Thakor N. and Bezerianos A., "Revealing cross-frequency causal interactions during a mental arithmetic task through symbolic transfer entropy: a novel vector-quantization approach, *IEEE Trans. Neural Systems Rehab Eng.*, vol. 24(1), pp. 1017-1028, 2016. 10.1109/TNSRE.2016.2516107

- [297] Liu S, Xiang P, Fisgin AC, Belegu V, Thakor NV, et al., "Myelination of motor neurons derived from mouse embryonic Stem cells by Oligodendrocytes derived from mouse embryonic stem cells in a microfluidic compartmentalized platform. J Stem Cell Res, 5:304. 2015. doi:10.4172/2157-7633.1000304
- [298] Yu H., Senarathna J., Tyler B. M., Thakor N. V., Pathak A.P, "Miniaturized optical neuroimaging in unrestrained animals," Neuroimage, Vol. 113, pp. 397-406, 2015.
- [299] Hotson G., McMullen D. P., Fifer M.S., Johannes M. S., Katyal K. D., Para M. P., Armiger R., Anderson W. S., Thakor N. V., Wester B. A., Crone N. E., "Individual finger control of the modular prosthetic limb using high-density electrocorticography in a human," J Neural Eng., 13(2):026017, 2016. doi: 10.1088/1741-2560/13/2/026017. Feb 10.PMID: 26863276
- [300] Hotson G., Smith R., Rouse A. G., Schieber M., Thakor N., Wester B. "High precision neural decoding of complex movement trajectories using recursive Bayesian estimation with dynamic movement primitives", IEEE Robotics and Automation Letters (RA-L), pp. 676-683, Volume: 1, No. 2, July 2016, DOI: 10.1109/LRA.2016.2516590.
- [301] Patil A.C., Thakor N.V., "Implantable neurotechnologies: a review of micro and nano-electrodes for neural recording," Med Biol Eng Comput, vol. 54(1), 2016. doi:10.1007/s11517-015-1430-4
- [302] Nag S., Thakor N. V., "Implantable neurotechnologies: electrical stimulation and applications. Med Biol Eng Comput, Vol. 54(1), 2016. doi:10.1007/s11517-015-1442-0
- [303] Ng KA, Greenwald E., Xu Y.P., Thakor N.V., "Implantable neurotechnologies: a review of integrated circuit neural amplifiers," Med Biol Eng Comput, vol. 54(1), 2016. doi:10.1007/s11517-015-1431-3
- [304] Greenwald E., Masters M. R., Thakor N. V., "Implantable neurotechnologies: bidirectional neural interfaces—applications and VLSI circuit implementations," Med Biol Eng Comput, Vol. 54(1), 2016. doi:10.1007/s11517-015-1429-x
- [305] Hotson G., Fifer M. S., Acharya S., Benz H. L., Anderson W. S., Thakor N. V., Crone N. E., "Coarse Electrocorticographic decoding of ipsilateral reach in patients with brain lesions, Plos One, 9(12):e115236. doi:10.1371/journal.pone.0115236.
- [306] Yan Y., Boey D., Ng L. T., Gruber J., Bettiol A., Thakor N., Chen C.-H., "Continuous-flow *C. elegans* fluorescence expression analysis with real-time image processing through microfluidics," Biosensors Bioelectr., Volume 77, pp. 428–434, 15 March 2016. doi:10.1016/j.bios.2015.09.045.
- [307] Sun Y., Lee, R., Chen Y., Collinson S., N. Thakor, A. Bezerianos, Sim K., "Progressive gender differences of structural brain networks in healthy adults: a longitudinal diffusion tensor imaging study," PLoS One, 10(3), e0118857, 2015, doi: 10.1371/journal.pone.0018857.
- [308] Taya, F., Sun, Y., F. Babiloni, N. Thakor, A. Bezerianos, "Brain enhancement through cognitive training: a new insight from brain connectome," Frontiers Systems Neurosci., 9: e44, 2015.
- [309] Xu N., Sun T., Tsang W. M., Delgado-Martinez I., Lee S-H., Seshadri S., Xiang Z., Merugu S., Gu Y., Yen S-C., Thakor N. V. "Polymeric C-shaped cuff electrode for recording of peripheral nerve signal," Sensors and Actuators B: Chemical, 210\_ 640-648, 2015.
- [310] Dimitriadis S., Sun Y., Laskaris, N., Thakor, N., Bezerianos, A., "Cognitive workload assessment based on the tensorial treatment of EEG estimates of cross-frequency phase interactions," Annals Biomed. Eng., 43(4), 977-989, 2015.
- [311] Lee WW, Kukreja SL, Thakor NV., "CONE: Convex-optimized-synaptic efficacies for temporally precise spike mapping," IEEE Trans Neural Netw Learn Syst., 2016 Mar 24. [Epub ahead of print] PMID: 27046881.
- [312] Xiang Z., Sheshadri S., Lee S.-H., Wang J., Xue N., Thakor N. V., Yen S.-C., and Lee S., "Mapping of small nerve trunks and branches using adaptive flexible electrodes," Adv. Sci., 1500386, 2016, DOI: 10.1002/advs.201500386.
- [313] Sheng Y. Liao, L.-D., Bandla, A., Liu Y.-H.; Thakor N.; Tan M. C. , ""Size and shell effects on the photoacoustic and luminescence properties of dual modal rare-earth doped nanoparticles for infrared photoacoustic imaging" ACS Biomat. Sci. Eng. Manuscript ID: ab-2016-00012p.R1
- [314] Borghini G., Aricò P., Graziani I., Salinari S., Sun Y., Taya F. Bezerianos A., Thakor N. V., Babiloni F., "Quantitative assessment of the training improvement in a motor-cognitive task by using EEG, ECG and EOG signals," Brain Topography, Vol. 29 (Issue 1), pp 149-161, 2016.
- [315] Wang J., Xiang Z., Gammad G. G. L., Thakor N. V., Yen S.-C., and Lee C., "Development of flexible multi-channel muscle interfaces with advanced sensing function," Sensors & Actuators: A. Physical, Vol. 249, 1 Pages 269-275, October, 2016. <https://doi.org/10.1016/j.sna.2016.07.034>

- [316] Alam M., Rodrigues W., Bau Ngoc Pham B. N., and Thakor N. V., "Brain-machine interface facilitated neurorehabilitation via spinal stimulation after spinal cord injury: Recent progress and future perspectives," *Brain Res.*, Sep 1, 2016:1646:25-33. doi: 10.1016/j.brainres.2016.05.039. Epub 2016. Review. PMID: 27216571
- [317] Li J., Lim J., Yu Chen, Wong K., Thakor N., Bezerianos A., and Sun Y., "Mid-task break Improves global integration of functional connectivity in lower alpha band," *Front. Hum. Neurosci.*, Jun 17;10:304. doi: 10.3389/fnhum.2016.00304. eCollection 2016., PMID: 27378894.
- [318] Cetinkaya-Fisgin A., Joo M. G., Ping X., Thakor N. V., Ozturk C., Hoke A., Yang I. H., "Identification of fluocinolone acetonide to prevent paclitaxel induced peripheral neuropathy," *J Peripheral Nervous System*, DOI: 10.1111/jns.12172, 2016. PMID: PMID: 27117347.
- [319] Taya F., de Souza J., Thakor N. V., Bezerianos A., "Comparison method for community detection on brain networks from neuroimaging data, *Appl Netw Sci* 1: 8, 2016. DOI: 10.1007/s41109-016-0007-y.
- [320] Cai X., Zhang C.-J., Lim F., Chan S. J., Bandla A., Chuan C. K., Hu F., Xu S., Thakor N. V., Liao L.-D.; Liu B., "Organic Nanoparticles with aggregation-induced emission for bone marrow stromal cell tracking in a Rat PTI Model", *Small*, <http://dx.doi.org/10.1002/sml.201601630>, 2016. PMID: 27592863
- [321] Dimitrakopoulos G. N., Sun Y., Ardian K., Thakor N. V., and Bezerianos A., "A method for cross-task mental workload classification based on brain connectivity," *Frontiers Human Neurosci.*, 2016. DOI=10.3389/conf.fnhum.2016.220.00002
- [322] Osborne L., Kaliki. R., Soares A., and Thakor N., "Neuromorphic event based detection for closed-loop tactile feedback control of upper limb prostheses" *IEEE/ASME Trans. Haptics*, Special Issue: Active Touch Sensing in Robots, Humans and Other Animals, Vol. 9 (2), pp. 196 – 206, 2016.
- [323] Greenwald E., So E., Mollazadeh M., Maier C., Wang Q., Etienne-Cummings R., Cauwenberghs G., Thakor, N., "A bidirectional neural interface IC with chopper stabilized BioADC array and charge balanced stimulator," *IEEE Biomed. Circuits Systems*, Vol.10(5):990-1002, 2016. doi: 10.1109/TBCAS.2016.2614845.
- [324] Lee, H. U., Nag S., Jin Y. Agata B., Thakor N.; Yang I. H., "Subcellular optogenetic stimulation for activity-dependent myelination of axons in a novel microfluidic compartmentalized platform," *ACS Chem Neurosci.*, Vo. 7, pp. 1317-1324, 2016. PMID: 27570883
- [325] Cai X, Bandla A, Mao D, Feng G, Qin W, Liao LD, Thakor N, Tang BZ, Liu B, "Biocompatible red fluorescent organic nanoparticles with tunable size and aggregation-induced emission for evaluation of blood-brain barrier damage," *Adv Mater.*, 2016 Aug 11. doi: 10.1002/adma.201601191. [Epub ahead of print], PMID: 27511643.
- [326] Cai X, Liu X, Liao LD, Bandla A, Ling JM, Liu YH, Thakor N, Bazan GC, Liu B., "Encapsulated conjugated oligomer nanoparticles for real-time photoacoustic sentinel lymph node imaging and targeted photothermal therapy," *Small*, 2016 Jul 21. doi: 10.1002/sml.201600697. [Epub ahead of print], PMID: 27439884.
- [327] Bodala IP, Li J, Thakor NV, Al-Nashash H., "EEG and eye tracking demonstrate vigilance enhancement with challenge integration," *Front. Hum. Neurosci.* 2016 Jun 7;10:273. doi: 10.3389/fnhum.2016.00273. eCollection 2016. PMID: 27375464.
- [328] Taya F, Sun Y, Babiloni F, Thakor N, Bezerianos A., "Topological changes in the brain network induced by the training on a piloting task: An EEG-based functional connectome approach," *IEEE Trans Neural Syst Rehabil Eng.*, Vol. 26(2), pp. 263 – 271, 2016 Jun 16. [Epub ahead of print], PMID: 27333606 [10.1109/TNSRE.2016.2581809](https://doi.org/10.1109/TNSRE.2016.2581809).
- [329] Ren S., Li J., Taya F., deSouza J., Thakor N., Bezerianos A., "Dynamic functional segregation and Integration in human brain network during complex tasks," *IEEE Trans Neural Syst Rehabil Eng.*, Vol 25 (6) pp. 547-556, 2016, DOI: 10.1109/TNSRE.2016.2597961.
- [330] Lee S., Zhuolin Xiang Z., Liao L.-D., Bandla A., Xue N., Thakor N. V., Yen S.-C. and Lee C., "Flexible and adjustable neural interface with selective nerve recording and stimulation for neuromodulation," *Adv. Mater.*, 2016.
- [331] Cai X., Bandla,A., Mao D., Feng G., Qin W., Liao L.-D., Thakor N., Tang B. Z. and Liu B., "Biocompatible red Fluorescent organic nanoparticles with tunable size and aggregation-induced emission for evaluation of blood–brain barrier damage," *Adv. Mater.*, 28: 8760–8765, 2016. doi:10.1002/adma.201601191.

- [332] Cai X., Liu X., Liao L.-D., Bandla A., Ling J. M., Liu Y.-H., Thakor N., Bazan G. C. and Liu B., "Encapsulated conjugated oligomer nanoparticles for real-time photoacoustic sentinel lymph node imaging and targeted photothermal therapy," *Small*, 12: 4873–4880, 2016, doi:10.1002/smll.201600697.
- [333] Cai X., Zhang C. J., Wei Lim F. T., Chan S. J., Bandla A., Chuan C. K., Hu F., Xu S., Thakor N. V., Liao L.-D., Liu B., "Cell tracking: organic nanoparticles with aggregation-induced emission for bone marrow stromal cell tracking in a rat PTI model," *Small*, Vol. 12 (47), pp. 6419-6419, 2016.
- [334] Sundar R., Bandla A., Stacey Sze Hui Tan, Liao L.-D., Kumarakulasingham N. B., Jeyasekharan A. D., Wei Ow S. G., Ho J., Peng Tan D. S., Jing Lim J. S., Vijayan J., Therimadasamy A. K., Hairom Z., Ang E., Ang S., Thakor N. V., Lee S. C., Wilder-Smith E. P., "Limb Hypothermia for Preventing Paclitaxel-Induced Peripheral Neuropathy in Breast Cancer Patients: a pilot study," *Frontiers of Oncology*, 2017.
- [335] Miao P., Zhang L., Li M., Zhang Y., Feng S., Wang Q., and Thakor N. V. "Chronic wide-field imaging of brain hemodynamics in behaving animals," *Optics Express*, Vol. 8, Issue 1, pp. 436-445, 2017. <https://doi.org/10.1364/BOE.8.000436>.
- [336] Lee S., Wang H., Qiongfeng Shi Q., Dhakar L., Wang J., Thakor N. V., Yen S.-C., Lee C., "Development of battery-free neural interface and modulated control of tibialis anterior muscle via common peroneal nerve based on triboelectric nanogenerators (TENGs)," *Nano Energy*, Vol. 33, pp. 1-11, 2017.
- [337] Lee H. U., Blasiak A., Agarwal D. R., Loong D. T. L., Thakor N. V., All A. H., Ho J. S., Yang I. H., "Subcellular electrical stimulation of neurons enhances the myelination of axons by oligodendrocytes," *PLoS ONE* 12(7): e0179642, 2017. <https://doi.org/10.1371/journal.pone.0179642>
- [338] Lee S., Sheshadri S., Xiang Z., Delgado-Martinez I., Xue N., Sun T., Thakor N. V., Yen S.-C., Lee C., "Selective stimulation and neural recording on peripheral nerves using flexible split ring electrodes," *Sensors and Actuators B: Chemical*, Vol. 242, pp. 1165-1170, 2017.
- [339] Greenwald E., Maier C., Wang Q., Beaulieu R., Etienne-Cummings R., Cauwenberghs G., Thakor N., "A CMOS current steering neurostimulation array with integrated DAC calibration and charge balancing," *IEEE Trans. Biomedical Circuits Systems*, Jan 16, 2017. PMID: 28092575 DOI: [10.1109/TBCAS.2016.2609854](https://doi.org/10.1109/TBCAS.2016.2609854).
- [340] Lee W. W., Kukreja S. L., Thakor N. V., "Discrimination of dynamic tactile contact by temporally precise event sensing in spiking neuromorphic networks," *Frontiers Neurosci.*, Vol. 11, 5, 31 January, 2017. <https://doi.org/10.3389/fnins.2017.00005>
- [341] Sheng Y., Liao L.-D., Bandla A., Liu Y. H., Yuan J., Thakor N., Tan M. C., "Enhanced near-infrared photoacoustic imaging of silica-coated rare-earth doped nanoparticles," *Materials Science and Engineering: C*, Vol. 70, pp. 340-346, 2017.
- [342] Jegadeesan R., Agarwal K., Guo Y.-X., Yen S.-C., and Thakor N. V., "Wireless power delivery to flexible subcutaneous implants using capacitive coupling," *IEEE Trans. Microwave Theory and Techniques*, Vol. 65, No. 1, pp. 280-292, 2017.
- [343] Lee S. Wang H., Shi Q., Dhakar L., Wang J., Thakor N. V., Yen S.-C., C. Lee, "Development of battery-free neural interface and modulated control of tibialis anterior muscle via common peroneal nerve based on triboelectric nanogenerators (TENGs)," *Nano Energy*, Vol. 33, pp. 1–11, 2017.
- [344] Mishra A., Ghosh R., Principe J. C., Thakor N. V., Kukreja S. L., "A saccade based framework for real-time motion segmentation using event based vision sensors" *Frontiers Neurosci.*, 03 March 2017 | <https://doi.org/10.3389/fnins.2017.00083>.
- [345] Beaulieu R. J., Masters M. R., Betthausen J., Smith R. J., Kaliki R., Thakor N. V., and Soares A., "Multi-position training improves robustness of pattern recognition and reduces limb-position effect in prosthetic control," *JPO: J.Prosthetics Orthotics*, Vol. 29 (2), pp. 54-62, 2017.
- [346] Low J. H., Lee W.W., Khin P.M., Thakor N. V., Kukreja S.L., Ren H.L., Yeow C.H., "Hybrid tele-manipulation system using a sensorized 3-D-printed soft robotic gripper and a soft fabric-based haptic glove," *IEEE Robotics and Automation Letters*, Vol. 2 (2), pp. 880-887, 2017.
- [347] Zhao X., Sheng Y., Liao L.D., Thakor N., Tan M.C., "Rare-earth doped CaF<sub>2</sub> nanocrystals for dual-modal short-wavelength infrared fluorescence and photoacoustic imaging," *Nanoscience Nanotechnology Letters*, Vol. 9 (4), pp. 481-488, 2017.



- [348] Sun Y., Lim J., Dai Z., Wong K.F., Taya F., Chen Y., Li J., Thakor N. V., Bezerianos A., "The effects of a mid-task break on the brain connectome in healthy participants: A resting-state functional MRI study," *NeuroImage*, Vol. 152, 19-30, 2017.
- [349] Cai X., Liu J., Liew W.H., Duan Y., Thakor N. V., Yao K., Liao L., Liu B., "Organic molecules with propeller-structures for efficient photoacoustic imaging and photothermal ablation of cancer cells," *Materials Chemistry Frontiers*, 2017.
- [350] Puttaswamy S. V., Shi Q., Bandla A., Kim S., Thakor N. V. and Lee C., "Nanowire electrodes integrated on tip of microwire for peripheral nerve stimulation," *IEEE J. Microelectromechanical Systems*, 10.1109/JMEMS.2017.2696240.
- [351] Betthausen J. L., Hunt C. L., Osborn L. E., Masters M. R., L'evay G., Kaliki R. R., and Thakor N. V., "Limb position tolerant pattern recognition for myoelectric prosthesis control with adaptive sparse representations from extreme learning," *IEEE Trans. Neural Systems Rehab. Eng.*, pp. 770 – 778, Vol.65, No. 4, 2017, DOI: 10.1109/TBME.2017.2719400.
- [352] Miao P., Li M., Wang Q., Li Y., Zhang L., Sherman D. L., and Thakor N. V., "Beta oscillation in primary motor cortex couples with the supplying artery's blood flow activities in freely moving rats," *J. Biophotonics*, 2017.
- [353] Chen N., Tian L., Patil A. C., Peng S., Yang I. H., Thakor N. V., Ramakrishna S., "Neural interfaces engineered via nano- and microstructured coatings." *Nano Today*, Vol. 14, pp. 59–83, June 2017. <https://doi.org/10.1016/j.nantod.2017.04.007>.
- [354] Bandla A., Liao L.-D., Chan S.-C., Ling J. M., Liu Y.-H., Shih I. Y.-Y., Pan H.-C., Peter Tsun- Wong H., Lai H.-Y., King N. K. K., Chen Y.-Y., Ng W. H., and Thakor N. V., "Simultaneous functional photoacoustic microscopy and electrocorticography reveal the impact of rtPA on dynamic neurovascular Functions after cerebral ischemia," *J. Cerebrovasc. Flow Metabolism*, 38(6):980-995, 2018. doi: 10.1177/0271678X17712399. Epub 2017 Jul 7.
- [355] Agarwal K., Jegadeesan R., Guo Y.-X., Thakor N. V., "Wireless power transfer strategies for implantable bioelectronics: Methodological review," *IEEE Reviews Biomedical Eng.*, Vol. 1- (1), pp. 136-161, 2017. [10.1109/RBME.2017.2683520](https://doi.org/10.1109/RBME.2017.2683520)
- [356] Dai Z., de Souza J., Lim J., Ho P., Chen Y., Li J., Thakor N., Bezerianos A., Sun Y., "EEG cortical connectivity analysis of working memory reveals topological reorganization in theta and alpha bands," *Frontiers Human Neurosci.*, *Front. Hum. Neurosci.*, 12 May 2017 | <https://doi.org/10.3389/fnhum.2017.00237>
- [357] Lee S., Wang J., Yang F., Ho J. S., Thakor N. V., Yen S.-C., Lee C., "Toward bioelectronic medicine - neuromodulation of small peripheral nerves using flexible neural clip (FNC)" *Advanced Science*, 26 July 2017. <https://doi.org/10.1002/advs.201700149>
- [358] Sumsy S. L., Schieber M., Thakor N. V., and Sarma S. "Decoding kinematics using task-independent movement-phase-specific encoding models," *IEEE in Trans. Neural Systems Rehab. Eng.*, 2017. 10.1109/TNSRE.2017.2709756.
- [359] Sciaraffa N., Borghini G., Aricò P., Di Flumeri G., Colosimo A., Bezerianos A., Thakor N. V., and Babiloni F., "Brains interaction during cooperation: evaluating 2 local properties of multiple-brain network," *Brain Sci.*, 7 (7), 90, 2017.
- [360] Liu Y-H, Chan S. J., Pan H.-C., Bandla A., King N. K.K., Wong P.T.H., Chen Y-Y., Ng W. H., Thakor N.V., and Liao L-D., "An integrated treatment modality of cathodal-transcranial direct current stimulation with peripheral sensory stimulation affords neuroprotection in a rat stroke model," *J. Neurophotonics*, 4 (4), 045002, 2017.
- [361] Modi H. R., Wang Q., Sahithi G.D., Sherman D., Greenwald E., Savonenko A. V., Geocadin R. G., Thakor N. V., "Intranasal post-cardiac arrest treatment with orexin-A facilitates arousal from coma and ameliorates neuroinflammation," *PloS One* 12 (9), e0182707, 2017.
- [362] Liu R., Wang Y., Newman G. I., Ying S., Thakor N. V., "EEG classification with a sequential decision-making method in motor imagery BCI," *Int. J. Neural Systems*, Vol. 27, No. 8, 2017. <https://doi.org/10.1142/S0129065717500460>.
- [363] Cha K. M., Thakor N. V., Shin H. C., "Novel early EEG measures predicting brain recovery after cardiac arrest," *Entropy* 19 (9), 466, 2017.
- [364] Mahmoud R., Shanableh T., Bodala I. P., Thakor N., Al-Nashash H, "Novel classification system for classifying cognitive workload levels under vague visual stimulation," *IEEE Sensors J.* Vol. 17 (21), pp. 7019 – 7028, 2017. [10.1109/JSEN.2017.2727539](https://doi.org/10.1109/JSEN.2017.2727539)

- [365] F. A. Hassani, G. G. L. Gammad, R. P. Mogan, T. K. Ng, T. L. C. Kuo, L. G. Ng, P. Luu, N. V. Thakor, S.-C. Yen, C. Lee, "Design and anchorage dependence of shape memory alloy actuators on enhanced voiding of a bladder," *Adv. Mat. Tech.*, 1700184, DOI: 10.1002/admt.201700184, 2017.
- [366] Smith R. J., Soares A., Rouse A., Schieber M., and Thakor N., "Modeling task-specific neuronal ensembles improves decoding of grasp" *J. Neural Eng.*, 2018. <https://doi.org/10.1088/1741-2552/aaac93>.
- [367] Liu J., Cai X., Pan H.-C., Bandla A., Chuan C. K., Wang S., Thakor N., Liao L.-D., Liu B., "Molecular Engineering of photoacoustic Performance by chalcogenide variation in conjugated polymer nanoparticles for brain vascular imaging, *Small*, 7 February 2018, DOI: 10.1002/smll.201703732.
- [368] Rassouli M., Yi C., Basu A., Kukreja S., and Thakor N. V., "An extreme learning machine-based neuromorphic tactile sensing system for texture recognition," *IEEE Trans. Biomed. Circuits Systems*, pp.313 - 325 Vol.12, No. 2, 2018;DOI: [10.1109/TBCAS.2018.2805721](https://doi.org/10.1109/TBCAS.2018.2805721)
- [369] Wang Q., Miao P., Modi H., Garikapati S., Koehle R., Thakor N., "Therapeutic hypothermia promotes cerebral blood flow recovery and brain homeostasis after resuscitation from cardiac arrest in a rat model," *J. Cerebrovasc. Flow Metab.* <https://doi.org/10.1177/0271678X18773702>.
- [370] Hadjiabadi D., Pung L. Zhang J., Ward B., Lim W-T., Kalavar M. Thakor N. Biswal B., Pathak, A., "Brain tumors disrupt the resting state connectome," *Neuroimage Clin.* 2018; 18: 279–289.. doi: [10.1016/j.nicl.2018.01.026](https://doi.org/10.1016/j.nicl.2018.01.026)
- [371] Li J-H, Thakor N. V., Bezerianos A., "Hemispherical Asymmetry of spectral power density in Beta band: A Study with and without Exoskeleton," *Sci. Reports.* *Sci Rep.* 2018; 8: 13470.. doi: [10.1038/s41598-018-31828-1](https://doi.org/10.1038/s41598-018-31828-1), PMCID: PMC6128944, PMID: [30194397](https://pubmed.ncbi.nlm.nih.gov/30194397/)
- [372] Peh W. Y. X., Mogan R., Thow X. Y., Chua S. M., Rusly A., Thakor N. V., Yen S.-C. "Novel neuromodulation of autonomic pelvic nerves overcomes bladder-sphincter dyssynergia," *Front. Neurosci.*, 21 March 2018 | <https://doi.org/10.3389/fnins.2018.00186>.
- [373] Osborn L. E, Dragomir A. Betthausen J. L., Hunt C. L., Nguyen H. H., Kaliki R. R., and Thakor N. V., "Prosthesis with neuromorphic multilayered e-dermis perceives touch and pain," *Science Robotics.*, 3, eaat3818 (2018) 20 June 2018.
- [374] Cabibihan J.-J., Abubasha M. K., and Thakor N. V., "A method for 3D printing patient-specific prosthetic arms with high accuracy shape and size," *IEEE Access*, pp. 25029 – 25039, Vol. 6, 2018.DOI: [10.1109/ACCESS.2018.2825224](https://doi.org/10.1109/ACCESS.2018.2825224).
- [375] Peh, W. Y. X., Yen X. Raczkowska, M. ; Teh Y., Alam M. Thakor N. Yen, S.-C., "Closed-loop stimulation of the pelvic nerve for optimal micturition" *J. Neural Eng.*, Dec;15(6):066009, 2018 doi: [10.1088/1741-2552/aadee9](https://doi.org/10.1088/1741-2552/aadee9)
- [376] Choi H., You K.-J., Thakor N. V., Schieber M.H., and Shin H.-C., "Single-finger neural basis information-based neural decoder (nBINDER) for multi-finger movements," *IEEE Trans. Biomed. Eng.*, vol. 26(12), pp. 2240-2248, 2018. [10.1109/TNSRE.2018.2875731](https://doi.org/10.1109/TNSRE.2018.2875731)
- [377] Nuan C. , Luo B., Yang I. H., Thakor N. V., Ramakrishna S., "Biofunctionalized platforms towards long-term neural interface," *J. Current Opinion Biomed. Eng.*, Vo. 6, pp. 81-91, 2018. <https://doi.org/10.1016/j.cobme.2018.03.002>
- [378] Duan Y., Xu Y., Mao D., Liw W. H., Guo B., Wang S., Cai X. M., Thakor N., Yao K., Zhabt C.-J., and Liu B., "Photoacoustic and magnetic resonance imaging bimodal contrast agent displaying amplified photoacoustic signal," *Small*, <https://doi.org/10.1002/smll.201800652>, 2018.
- [379] Taya F., Dimitriadis S. I., Dragomir A., Lim J., un Y., Wong K. F., Thakor N. V., Bezerianos A. "Fronto-parietal subnetworks flexibility compensates for cognitive decline due to mental fatigue," *Human Brain Mapp.*, Vol. 39, pp. 3528-3545, 2018. DOI: 10.1002/hbm.24192.
- [380] Thomas T. M., Candrea D. N., Fifer M. S., McMullen M. S., Anderson W. S., Thakor N. V., Crone N. E., "Decoding native cortical representations for flexion and extension at upper limb joints using electrocorticography," *IEEE Trans. Neural Systems Rehab Eng.*, Vol. 27(2), pp. 293-303, 2019. DOI: [10.1109/TNSRE.2019.2891362](https://doi.org/10.1109/TNSRE.2019.2891362)
- [381] Blasiak A., Guerin T.H.M., Yang I.H., Lahiri A., and Thakor. N. V., "Fibro-Neuronal guidance on Common, 3D-printed textured substrates," *IEEE Trans. NanoBio Sci.* [15 Mar 2019] (PMID:30892222)DOI: [10.1109/TNB.2019.2905469](https://doi.org/10.1109/TNB.2019.2905469)
- [382] Liang L., The D.B. L., Dinh N-D., Cheri W., Chen Q., Wu T. Chowdhury S., Yamanaka A., Sum T-C., Chen C.-H., Thakor N. V., All A. H. Liu X., "Upconversion amplification through dielectric

- superlensing modulation," Nature Comm., Vol. 10, p. 1391, 2019. doi.org/10.1038/s41467-019-09345-0.
- [383] Wang J., Hao Wang H., Thakor N. V., and Lee C., "Self-Powered direct muscle stimulation using a triboelectric nanogenerator (TENG) integrated with a flexible multiple-channel intramuscular electrode," ACS Nano, Vol. 13, pp. 3589-3599, 2019.
- [384] Palanisamy M., Veluru J.B., Arjun S., Bandla A., Thakor N., Ramakrishna S., Wei H., "Design of thermoelectric generator and its medical applications," Designs, 2019, 3(2), 22; <https://doi.org/10.3390/designs3020022>
- [385] Osborn L., Betthauer J. L., and Thakor, N.V., "Neuroprosthesis," Wiley Encyclopedia of Electrical Engineering, J. G. Webster (Ed). 21 February 2019 <https://doi.org/10.1002/047134608X.W1424.pub2>
- [386] Veluru J. B. , Kumar P. M., Arjun S., Bandla A., Thakor N., Hey J., Ramakrishna S., He W., "An investigation of an efficient heat transfer in a flexible Peltier with/without copper used as effective heat transfer material," Int. J. Heat Transfer Mat. (under review). Zeng X., Chen S., Weitemier A.; Han S., Blasiak A., Prasad A., Zheng K., Yi Z., Luo B., Yang I.-H., Thakor N., Chai C., Lim K.-L., McHugh T., All A., Liu X., " Visualization of intra-neuronal motor protein transport through upconversion microscopy" Angewandte Chemie, doi.org/10.002/ange.2012904208.
- [387] Qi P., Ru H., Gao L., Zhang X., Zhou T., Tian Y., Thakor N., Bezerianos A., Li J., Sun Y., "Neural Mechanisms of mental fatigue revisited: New insights from the brain connectome," Engineering, Vol. 5, pp. 276-286, 2019.
- [388] Li J., Dimitrakopoulos G., Pavithra T, Gong C, Sun Y, Guo Z, Yu H, Thakor N., and Bezerianos A., "What Are Spectral and Spatial Distributions of EEG-EMG Correlations in Walking? An Exploratory Study," IEEE Access, 10.1109/ACCESS.2017.DOI, 2019.
- [389] Cai X., Bandla A., Chuan C. K., Magarajah G., Liao L.-D., Teh L., Kennedy B. K., Thakor N., and Liu B., "Identifying glioblastoma margin using dual-targeted organic nanoparticles for efficient in vivo fluorescence image-guided photothermal therapy," Materials Horizons, Issue 2, 2019.
- [390] Harvy J., Thakor N., Bezerianos A., Li J. "Between-frequency topographical and dynamic high-order functional connectivity for driving drowsiness assessment," IEEE Trans. Neural Systems Rehab Eng., 2019 (accepted).
- [391] Khalifa A., Liu Y., Karimi Y., Wang Q., Eisape A., Stanacevic M., Thakor N., Bao Z., Etienne-Cummings R., "The Microbead: A 0.009 mm<sup>3</sup> implantable wireless neural stimulator" Article reference: J Neural Eng., JNE-102886 (accepted).
- [392] Ponraj G., Prituja A. V., Li C., Guoniuz Z., Thakor N.V., and Ren H., " Pinch grasp and suction for delicate object manipulations using modular anthropomorphic robotic gripper with soft layer enhancements," Robotics, (Accepted).
- [393] Patil A., Bandla A., Liu Y.-H., Luo B., Thakor N.V., "Nontransient silk sandwich for soft, conformal bionic links," Materials Today (Accepted).
- [394] Nakgawa A., et al, "A bio-inspired slip detection and reflex-like suppression method for robotic manipulators," IEEE Sensors J., pp. 1-11; Print ISSN: 1530-437X; Online ISSN: 1558-1748, doi: 10.1109/JSEN.2019.2939506
- [395] Daniel Boon Loong Teh, Ankshita Prasad, Wenxuan Jiang, Nianchen Zhang, Yang Wu, Hyunsoo Yang, Sanyang Han, Zhigao Yi, Yanzhuang Yeo, Toru Ishizuka, Limsoon Wong, Nitish Thakor, Hiromu Yawo, Xiaogang Liu, Angelo ALL, "Driving Neurogenesis in Neural Stem Cells with High Sensitivity Optogenetics" NeuroMolecular Medicine (accepted).'
- [396] Betthauer J. L., Krall J. T., Bannowsky S. G., L'evay G., Kaliki R. R., Fifer M.S., and Thakor N. V., "Stable responsive EMG sequence prediction and adaptive reinforcement with temporal convolutional networks," IEEE Trans. Biomed. Eng., (accepted).

Under review/Preparation

- [397] Miao P., Li M., Wang Q., Yu Z., Zhang L., Sherman D. L., and Thakor N. V., "Beta oscillation in primary motor cortex couples with arterial blood flow activities in freely moving rats," Sci. Reports (under review).
- [398] Li J., Thakor N., Bezerianos A., "Hemispherical asymmetry of power spectral density in beta band: A study with and without exoskeleton by. (under review: Human Brain Mapping: HBM-17-1158).
- [399] Wang H., Lee S., Shi Q., Wang J., Thakor N. V., Yen S.-C., and Lee C., "Flexible batteryless neuroprosthesis for fine nerve direct stimulation using water/air-hybrid triboelectric nanogenerator (WATENG)," Energy & Environmental Science. (under review)
- [400] Ghosh R., Gupat A. K. Tang S., Thakor N., "Spatiotemporal Feature Descriptor Learning and Point Tracking with Event-Based Vision" IEEE Trans. PAMI, TPAMI-2017-11-0824 (under review).
- [401] Fumihiko T., Dimitriadis S.; Dragomir A., Lim J.; Sun, Y., Wong, Foong K., Thakor N. V., A. Bezerianos, "Fronto-parietal subnetworks flexibility compensates for cognitive decline due to mental fatigue," Human Brain Mapping, (under review).
- [402] Li J., "The effect of unilateral exoskeleton on human brain: An EEG study," (CSB-2018-0002) Science Bulletin (under review).
- [403] Sun Y., Gao L., Lim J., Chen Y., Taya F., Thakor, N., Bezerianos, A., "Disintegrated temporal brain network during mental fatigue is reshaped by rest-break: a dynamic functional connectivity study," Human Brain Mapping (HBM-18-1063, under review).
- [404] Luo B., Tian L., Chen N., Ramakrishna S., Thakor N., Yang, I. H., "Electrospun nanofibers facilitate better alignment, differentiation, and long-term culture in an in vitro model of the neuromuscular junction (NMJ)," Biomaterials Science, 2018. 10.1039/C8BM00720A.
- [405] Peng, R. H., Peng Q., Yu T., Thakor N., Bezerianos A., Li J., Zhou T., Gao L., Zhang X., Sun Y. "Neural mechanisms of mental fatigue revisited: a new insight from brain connectome
- [406] Lahiri A., Ng K. A., Ling T. L., Wong M.D.S., Nuan C., Rusly A., Blasiak A., Yen S.C., Lasam G. G., Libedinsky C., and Thakor N. V., "Achieving *in-vivo* encapsulation of micro-electrodes within neural tissue: a new concept for creating a stable bionic interface for application in neuroprosthetics," (submitted).
- [407] Zhao, Z., Yuan, J.; Zhao, X.; Bandla, A.; Thakor, N. V; Tan, M. C., ""Double-shelled rare earth doped nanoparticles for infrared imaging and photothermal therapy" J.ACS Biomat. Science & Eng., Manuscript ID: ab-2019-00526y
- [408] Toward Minimally invasive therapeutic ultrasound: ultrasound-guided ablation in neuro-oncology  
Corresponding author: Dr Amir Manbachi  
Listed co-author(s): Mr Micah Belzberg, Dr. Alan Cohen, Dr Rajiv Iyer, Dr. Mari Groves, Mr Francisco Chavez, Dr Henry Brem, Dr Nao Gamo, Mr Kyle Morrison, Dr Stephen Restaino, Dr. Nicholas Theodore, Professor Nitish Thakor, Professor Mark Luciano, Mr Kah Timothy Xiong, Miss Smruti Mahapatra, ULTRAS\_2019\_324
- [409] Safety and Tolerability of Cryocompression as a Method of Enhanced Limb Hypothermia to Reduce Taxane-Induced Peripheral Neuropathy"  
Full author list: Aishwarya Bandla; Stacey Tan; Nesaratnam Kumarakulasinghe; Yiqing Huang; Sally Ang; Gayathiri Magarajah; Zarinah Hairom; Joline Lim; Alvin Wong; Gloria Chan; Natalie Ngoi; Emily Ang; Yee Mei Lee; Amanda Chan; Soo Chin Lee; Nitish Thakor; Einar Wilder-Smith; Raghav Sundarm, Supportive Care in Cancer
- [410]

## BOOK

**Quantitative EEG Analysis Methods and Clinical Applications, S. Tong and N. V. Thakor (Eds.), Artech House, Boston, MA, 2009.**

### **Handbook of Neuroengineering**

Editor in Chief

Springer-Nature Publishers

100+ chapter comprehensive and authoritative reference and state of the art book for the field of Neuroengineering

### **Book Chapters**

Thakor NV, Sherman D, “Wavelet (time-scale) analysis in biomedical signal processing,” in The Biomedical Engineering Handbook, J. Bronzino (Ed.), CRC Press, 886-906, 1995.

Thakor N. V., Baykal A., Casaleggio A, “Fundamental Analyses of Ventricular Fibrillation Signals by Parametric, Nonparametric, and Dynamical Methods,” in Advances in Processing and Pattern Analysis of Biological Signals pp. 273-295, 1996.

Thakor N. V. and Kong X., “Analyses of Transient and Time-Varying Evoked Potentials for Detection of Brain Injury,” in Advances in Processing and Pattern Analysis of Biological Signals, pp. 145 to 165, 1996.

Thakor NV, Kong X, “Analyses of transient and time-varying evoked potentials of detection of brain injury,” in Advances in Processing and Pattern Analysis of Biological Signals, I. Gath and G. Inbar (eds), Plenum Press, pp. 145-166, 1996.

Thakor NV, Baykal A, Casaleggio A, “Fundamental analyses of ventricular fibrillation signals by parametric, nonparametric, and dynamical methods,” in Advances in Processing and Pattern Analysis of Biological Signals, I. Gath and G. Inbar (eds), pp. 273-296, Plenum Press, 1996.

Thakor N., Gramatikov B., Sherman D., “Wavelet (Time-Scale) Analysis in Biomedical Signal Processing,” Electrical Engineering Handbook, Dec. 1999. <http://dx.doi.org/10.1201/9781420049510.ch56>

Thakor N. V, “Biopotentials and Electrophysiology Measurement,” in The Measurement, Instrumentation and Sensors Handbook on CD-ROM, Ch. 74, CRC Press 1999. Print ISBN: 978-0-8493-8347-2. eBook ISBN: 978-0-415-87617-9. DOI: 10.1201/9780415876179.ch74

Thakral A., Wallace J., Tomlin D., Seth N., Thakor N. V., “Surgical Motion Adaptive Robotic Technology (S.M.A.R.T): Taking the Motion out of Physiological Motion,” in Lecture Notes in Computer Sci, pp. 317-325, 2001. [http://dx.doi.org/10.1007/3-540-45468-3\\_38](http://dx.doi.org/10.1007/3-540-45468-3_38).

Tomlin D., Wallace J., Etienne-Cummings R., Thakor N., “Novel real-time tremor transduction technique for microsurgery,” Lecture Notes Comput. Sci., Vol. 2208, pp 376-383, 2001. [http://dx.doi.org/10.1007/3-540-45468-3\\_45](http://dx.doi.org/10.1007/3-540-45468-3_45).

Wallace J., Mozaffari N. H., Pan L., and Thakor N. V., “Fuzzy C-means Clustering Analysis to Monitor Tissue Perfusion with Near Infrared Imaging, in Lecture Notes in Computer Science, pp. 1213-1214, 2001. [http://dx.doi.org/10.1007/3-540-45468-3\\_167](http://dx.doi.org/10.1007/3-540-45468-3_167)

Lau WW, Ramey NA, Corsco JJ, Thakor NV, Hager GD, “Stereo based endoscopic tracking of cardiac surface deformation,” Medical Image Computing and Computer Assisted Intervention, MCCA-2004, Lecture Notes in Computer Science, Springer-Verlag, pp. 494-501, 2004.

Passeraub P. A. and Thakor N. V., “Interfacing Neural Tissue with Microsystems,” in Neural Engineering, pp. 49-83, 2005. [http://dx.doi.org/10.1007/0-306-48610-5\\_2](http://dx.doi.org/10.1007/0-306-48610-5_2).

Thakor N. V., Gramatikov B., and Sherman D., “Wavelet (Time-Scale) Analysis in Biomedical Signal Processing,” in Electrical Engineering Handbook, pp. 5-1-5-26, 2006. <http://dx.doi.org/10.1201/9781420003864.ch5>.

Wu D., Madhok J., Choi Y.-S., Jia X., and Thakor N. V., “Discovery of Long-Latency Somatosensory Evoked Potentials as a Marker of Cardiac Arrest Induced Brain Injury, “ in **IFMBE Proceedings**, pp. 101-104, 2010. [http://dx.doi.org/10.1007/978-3-642-14998-6\\_27](http://dx.doi.org/10.1007/978-3-642-14998-6_27)

Thakor N. V., “Academic Research and Teaching,” in **Career Development in Bioengineering and Biotechnology: Roads Well Laid and Paths Less Travelled**, Series in Biomedical Engineering, G. Madhavan, B. Oakley, L. Kun (Eds.), Springer, pp. 1 to 23, 2008. ISBN: 978-0-387-76494-8 (Print) 978-0-387-76495-5 (Online). [http://dx.doi.org/10.1007/978-0-387-76495-5\\_5](http://dx.doi.org/10.1007/978-0-387-76495-5_5).

Thakor N. V., “Modeling and Processing in Cardiology,” **Biomedical Engineering / Biomedizinische Technik**, Editor-in-Chief: Dössel, Olaf, Vol. 38, Issue s1, pp. 27–34, ISSN (Online) 1862-278X, ISSN (Print) 0013-5585, DOI: [10.1515/bmte.1993.38.s1.27](https://doi.org/10.1515/bmte.1993.38.s1.27), July 2009

Kang X., Schieber M., and Thakor, N. V., “Decoding Cognitive States from Neural Activities of Somatosensory Cortex,” in **Neural Information Processing, Lecture Notes in Computer Science**, Volume 7663, pp 68-75, 2012.

Thakor N. V. and Sherman D. L., “EEG Signal Processing: Theory and Applications,” in **Neural Engineering**, B. He (Ed.), Springer, pp. 259-303, 2013. [http://dx.doi.org/10.1007/978-1-4614-5227-0\\_5](http://dx.doi.org/10.1007/978-1-4614-5227-0_5)

Nag S. and Thakor N. V., “Electrical Stimulation,” **Handbook of Bioelectronics**, S. Carrar and K. Iniewski (Eds.), Springer Press, 2014.

Boustany N. and Thakor N. V., “Light scatter spectroscopy and imaging of cellular and subcellular events,” **CRC Handbook of Biophotonics**, T. Vo-Dinh (Ed), 2<sup>nd</sup> Ed., 2014.

S. Nag and N. V. Thakor, "Electrical Stimulation," Book chapter, Cambridge University Press, UK, ISBN: 9781107040830, Oct. 2015.

H. Yu, J.Senarathna, B. M. Tyler, N. V. Thakor, and A. P. Pathak, “Miniaturized optical neuroimaging systems,” 2017.

Transcranial Dynamic Fluorescence Imaging for the Study of the Epileptic Seizures  
Vyacheslav Kalchenko (1), Alon Harmelin (1), David Israeli (1), Babak Kateb, (2) Igor Meglinski (3), Qinggong Tang (4), Nitish V. Thakor (5), Anna Volnova (6), Vassiliy Tsytsarev (7), 2019.

## Editorials

Thakor N. V., “In the spotlight: Neuroengineering,” **IEEE Reviews in Biomedical Engineering**, Vol. 1, pp. 18-20, 2008. <http://dx.doi.org/10.1109/rbme.2008.2008231>

Thakor, N. V., “In the spotlight: Neuroengineering,” **IEEE Reviews in Biomedical Engineering**, Vol. 2, pp. 18-20, 2009. <http://dx.doi.org/10.1109/rbme.2009.2034697>

Thakor, N. V., “In the spotlight: Neuroengineering,” **IEEE Reviews in Biomedical Engineering**, Vol. 3, pp. 19-22, 2010. <http://dx.doi.org/10.1109/rbme.2010.2086872>

Thakor N. V., “In the spotlight: Neuroengineering,” **IEEE Reviews in Biomedical Engineering**, Vol. 4, pp. 20-23, 2011. <http://dx.doi.org/10.1109/rbme.2011.2174126>

Wheeler B., Thakor N., He B. “Special section on grand challenges in neuroengineering,” **IEEE Trans. Biomed. Eng.**, Vol. 58(7) pp. 1883. Jul 2011.

Thakor N. V., “In the Spotlight: Neuroengineering,” **IEEE Reviews in Biomedical Engineering**, Vol. 6, pp. 24-26, 2013. <http://dx.doi.org/10.1109/rbme.2012.2228515>

Thakor N. V., Moore D. F., Miranda R. A., Ling G. S. F., Guest Editorial Special Issue of DARPA NEST Proceedings, in IEEE Transactions on Neural Systems and Rehabilitation Engineering, Vol. 20 (2), pp. 113-116, 2012. <http://dx.doi.org/10.1109/tnsre.2012.2189499>

Thakor N. V. "Highlights: Transcranial imaging of functional cerebral hemodynamic changes in single blood vessels" J. Cerebral Blood Flow Metabolism, 04 Apr 2012

Thakor N. V., "Editorial," Medical & Biological Eng & Computing, Vol. 51, Issues 1-2, pp. 3-5, 2013. <http://dx.doi.org/10.1007/s11517-013-1045-6>

Thakor N. V., "Catching brain waves in a net," IEEE Spectrum, pp. 40-45, September, 2014.

## US PATENT APPLICATIONS

1. Multi-modal neural interfacing for prosthetic devices, SD Harshbarger, JD Beaty, RJ Vogelstein, NV Thakor  
US Patent 9,486,332
2. Electrode assemblies for detecting muscle signals in a prosthetic limb, RR Kaliki, N Malhotra, G Singhal, NV Thakor  
US Patent 8,591,599
3. Multi-channel neural signal amplifier system providing high CMRR across an extended frequency range, KA Ng, YP Xu, YEN Shih-Cheng, NV Thakor  
US Patent 9,867,574
4. Flexible neural strip electrodes, flexible neural ribbon electrodes and compartment based embedded nerve tissue electrode interfaces for peripheral nerves, Z Xiang, Yen Shih-Cheng, C Lee, S Lee, NV Thakor, A Lahiri, FA Bazley, ...  
US Patent App. 15/043,688
5. Automated method and apparatus for determining characteristics of nerve fibers, D Cheung, CL Christman, NV Thakor  
US Patent 5,231,580
6. Multimodal laser speckle imaging, A Rege, N Thakor, K Murari, N Li  
US Patent App. 14/879,260
7. Implantable myocardial ischemia detection, indication and action technology, A Natarajan, NV Thakor  
US Patent 6,501,983
8. Implantable myocardial ischemia detection, indication and action technology, A Natarajan, NV Thakor  
US Patent 7,277,745
9. Intraurethral continent prosthesis, A Natarajan, NV Thakor  
US Patent 6,638,208
10. Methods and devices for endoscopic imaging JM Wallace, A Natarajan, S Venkatesha, K Peacock, NV Thakor  
US Patent 7,744,528
11. Apparatus and methods for brain rhythm analysis, NV Thakor, A Bezerianos, F Al Hatib, H Al-Nashash, J Paul, D Sherman, ...  
US Patent 7,299,088
12. Method and devices for imaging and biopsy, J Wallace, S Venkatesha, K Peacock, N Thakor, A Natarajan  
US Patent App. 10/785,802
13. Endoscopic imaging of an organ system, JM Wallace, S Venkatesha, K Peacock, NV Thakor, A Natarajan  
US Patent 7,559,890
14. Methods and analysis for cardiac ischemia detection, H Zhang, N Thakor, J Wallace, A Natarajan  
US Patent App. 11/032,586



15. Methods and devices of imaging and biopsy, JM Wallace, S Venkatesha, K Peacock, NV Thakor, A Natarajan  
US Patent App. 13/253,821
16. Implantable myocardial ischemia detection, indication and action technology, A Natarajan, N Thakor  
US Patent App. 11/765,444
17. Non-invasive detection of in-stent stenosis and drug elution, G Barrett, J Wallace, N Thakor, A Natarajan  
US Patent App. 11/089,625
18. Magnetocentrifugation, NV Thakor  
US Patent 5,565,105
19. Method of extracting and evaluating paced heart beats using max-min transform analysis, H Zhang, A Natarajan, NV Thakor  
US Patent 7,542,794
20. Implantable myocardial ischemia detection, indication and action technology, A Natarajan, NV Thakor  
US Patent App. 12/573,055

### **National University of Singapore/SINAPSE Intellectual Property**

#### Patents Filed or pending

19. S. Lee, C. Lee, S. C. Yen, N. V. Thakor, A. Patil, A. Lahiri, F. A. Bazley, A. Vipin, I. Delgado Martinez, "The fabrication and use of silk fiber based invasive nerve interface electrode"; NUS Provisional Patent Application (PP/4960-627)
20. A. Patil, S. C. Yen, N. V. Thakor, J. J. Kortelainen, K. A. Ng, H. Al-Nashash, Z. Xiang, C. S. Nag, C. A. A. Poulard, I. Delgado Martinez, S. Lee, A. Lahiri, F. A. Bazley, and A. Vipin, "Graphene based Transducers for Picking up Neural Activity" ; NUS Provisional Patent Application (PP/4960-625)
21. K.A. Ng, Bioamplifier System Having High CMRR Extended To A Higher Frequency Range, US Provisional Patent Application No. 62/124,455. ILO Ref: 14325N-US/PRV
22. K.A. Ng, Neural Amplifier System Having Single Ended Front End Amplifiers with AC Input Common Range Enhancement- US Provisional Patent Application No. 62/124,456. ILO Ref: 14326N-US/PRV
23. Kian Ann Ng, Multi-Channel Neural Signal Amplifier System Providing High CMRR Across an Extended Frequency Range, USPTO patent: Application No. 15049235, US Provisional Patent Application No. U.S. 15/049,235
24. Ning Xue, Tao Sun, Alex Yuandong Gu, A Polymeric Three-Dimensional Peripheral Nerve Cuff Electrode With Protruding Bendable Probes; Singapore patent: Application No. 10201505050Y, June, 2015.

#### Invention Disclosures

1. ILO Ref PRV ID 14353N; PP/4960625 - Invention Title: Graphene Based Transducers for Picking Up Neural Activity, 2014, 1<sup>st</sup> Inventor Anoop Patil
2. 15018N; PP/4960627 - The Fabrication And Use Of Silk Fiber Based Invasive Nerve Interface Electrode, 2015; 1<sup>st</sup> Inventor Anoop patil

3. 14352N - Flexible Epineurial Strip Electrode for Neural Signal Recording and Stimulation, 2015; 1<sup>st</sup> Inventor Lee Sanghoon
4. 15019N - Flexible Neural Ribbon Electrodes, 2015
5. 16013N - Neural Clip Design For Clinical Neuroprosthetics and Neurotherapeutic Applications, 2013; 1<sup>st</sup> Inventor Lee Sanghoon
6. 13341N - Active Electronics for Neural Recording Electrodes  
1<sup>st</sup> inventor: Ng Kian Ann, 2013
7. 14339N - Electrode Design To Reduce EMG Artifact Contamination During Peripheral Nerve Recordings, 1<sup>st</sup> inventor: KORTELAINEN Jukka Johannes, 2015
8. 14325N; 62/124,455 - Bioamplifier System Having High CMRR Extended To A Higher Frequency Range; 1<sup>st</sup> inventor: Ng Kian Ann, 2015
9. 14326N; 62/124,456 - Neural Amplifier System Having Single Ended Front End Amplifiers with AC Input Common Range Enhancement; 1<sup>st</sup> inventor: Ng Kian Ann, 2015
10. A\*STAR ID: 10201505050Y, A Polymeric Three-Dimensional Peripheral Nerve Cuff Electrode With Protruding Bendable Probes; 2nd inventor: Xue Ning, 2013
11. 13369N - A device for creation of a chronic stable nerve-electrode interface, 1<sup>st</sup> inventor: Amitabha Lahiri, 2014
12. 15020N - Loop-Hook Electrodes, 1<sup>st</sup> inventor: Yen Shih Cheng

## **TRAINEES**

### Post-doctoral and Pre-doctoral Trainees

#### Selected Past Pre-Doctoral and Doctoral Trainees (>100)

M. Iskarous (Ph.D., current), Christopher Hunt (Ph.D., current), Darshini Balamurugam (Masters, 2019, current), Avinash Sharma (Masters, 2019, current), Teja Karri (Masters, 2019), Joseph Bettahuser (Ph.D., 2019, current), Luke Osborn (Ph.D., 2019), Sapna Kumar (Masters, 2018), Juhi Baskar (Masters, 2017), Robert Beaulieu (Masters, 2017), S. G. Sahithi (Masters, 2017), Damini Agarwal (Masters), Guy Hotson (Ph.D.), Elliot Greenwald (Ph.D.), Yu B. H., R. Smith, G. Newman, Matthew Fifer (Ph.D.), Marin Kheng (Research Assistant), Kyle Rupp (Ph.D.), Heather Benz (Ph.D.), Martin Leistner (Research Assistant/Masters), Rezina Siddique (Ph.D.), So E., Kang X., Lee I. H., Martin Vilarino (Masters), Deena Jamal (Masters), Michael Powell (Masters), Chen C. (Masters), Bhaskar Chennuri (Masters), Suneil Hosmane (Ph.D.), Abhishek Rege (Ph.D.), Vikram Aggarwal (Masters), Mohsem Mollazadeh (Ph.D.), Li Nan (Ph.D.), Faith Bazley (Masters), Matt Trachtenberg (Masters), Jai Madhok (Masters), Peng Miao (Ph.D.), Kartikeya Murari (Ph.D.), Soumyadipta Acharya (Ph.D.), G., Zhang D., Maneesha Aggarwal (Masters), Girish Singhal (Masters), Dan Wu (Masters), Ying Ma (Masters), Joshua Vogelstein (Ph.D. joint supervision/committee), Ani Chatterjee (Masters), Yoon-Ju Cho (Masters), Mika Koskinen (Ph.D., trainee), Lau W., Wallace J., Sauer C., Naware M., Brooke J., Gerovichev O., Agrawal M., Sarje A., Mulliken G., George P., Tsai Y-C, Johnson L., Chung W., Ghodadra R., Bandyopadhyay A., Atit M. K., M-C Ding; Ramos A, Thakral A., Stein L., Shenai M. H., Tong S., Godhadra, R., Riviere, C. N., Ranjan, R., Rajasekhar, S., Fishler M. G., Stingele, R., Goel, V., Braun J., Yi-Chun S., Poon P., Meste O., Natarajan, A., Vaz C. A., Bin Z., Xin-rong G., Nathan S. S., Province R.A., Biswajit A., Pan K., Gliner B.E., Yang M., Amaresan M., Reiter E., Shankar B., Becker J.C., Cheng Q., Lee H.S., McNeela M., Didier M.

#### Selected Past Post Doctoral Fellows and Research Associates

Aishwarya Bandla (2017-2019), Baiwen Luo (2017-), Vuong Pham (2018-), Deepesh Kumar (2018-), Junhua Li (2016-2019), Agata Blasiak (2016-2019), Kian-Ann Ng (2013-2019; jointly), Yan Y.J., Sun Y. (2013-2017, jointly with A. Bezerianos), Orchard Garrick (2013-2016), Lun-De Liao (2012-2015), Kerwin Zhemmin, Mansour Alam, Sudip Nag (2013-2016), Rangarajan J., Fumi Taya (with A. Bezerianos), S, Vputtaswamy, Biswas S., Rege A., Lee H.-U., Delgado I., Maybhate A., Akbari Y., Xiong W., Choi Y., Shin H-C, Ye D., Hong B., Tong S, Boustany N., Buitrago M. M., Sherman D., McIntyre C. C., Paul J. C., Philippe Passeraub, A. C. Almeida, Andy Luft (with Dan Hanley), Boris Gramatikov, Toshio Kimura., Jit Muthuswamy, Javier Saiz, Javier M.Ferrero (Jr), Romergryko Geocadin, J.-K. Park, Hao Lei, Feras Hatib, Ahmet Baykal, Xuan Kong, Pablo Laguna, ZhuYi-Sheng, Isaac N. Bankman, Yuji Murakawa, K. P. Kothiyal, Chen Shoupu

#### Pre-Doctoral and Doctoral Trainees (National University of Singapore):

Xu Yu (Ph.D., current), Thow X. Y. (Masters, current), Gayathri Magarajah (Ph.D, current) Marlina Razowska (Ph.D., current), Chen Nuan (Ph.D., joint supervision), Andrei Nakagawa (Ph.D, joint supervision), Nida Abbas (Masters, joint supervision), Abhishek Mishra (Ph.D.), Rohan Bose (Masters, current, joint supervision), Yu-Hang Liu (Ph.D, Anoop Patil (Ph.D.), Indu Prasad (Ph.D.), Wang Wei Lee (Ph.D.), Mahdi Rasouli (Ph.D.), Aishwarya Bandla (Ph.D.)

#### Present Post-Doctoral Fellows:

Johns Hopkins – Hiren Mod, Janaka Senarathana (joint supervision), Qihong Wang,  
NUS – Wendy Peh, K. Vogel, A. Bandla, Kush Agarwal, Anoop Patil,

#### Present Research Faculty/Associates:

Faculty - All A. (JHU), Bezerianos A. (NUS), A. Soares (SINAPSE)  
Research Associates - Yang I., Wang Q., Kaliki R., Ramsey K.,

#### Past Research Faculty/Associates:

Sherman D., Kukreja S., Soares A., Kim H., Jia X,

#### Present Faculty Collaborators:

Geocadin R., Crone N., Ewen J., Pathak A., Cauwenberghs G., Etienne-Cummings R., Bezerianos A., Babiloni F.

Trainee Awards

Siebel Award - Vikaram Aggarwal (2010), Suneil Hosmane (2011), Wu D. (2014)

IEEE Engineering in Medicine and Biology Best Paper Awardees

B. Shankar, Matthew Fishler, Cameron Riviere, Lee Johnson, Heather Benz, Abhishek Rege, Vikram Aggarwal and Soumyadipta Acharya