

GURNEET S. SANGHA

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EDUCATION AND TRAINING:

University of Maryland, College Park, Maryland Postdoc., Bioengineering	03/2020 – Present
Purdue University, West Lafayette, Indiana Ph.D., Biomedical Engineering	05/2014 – 12/2019
Rutgers University, New Brunswick, New Jersey B.S., <i>Summa Cum Laude</i> , Biomedical Engineering	09/2010 – 05/2014

RESEARCH EXPERIENCE:

Postdoctoral Fellow, University of Maryland Fischell Department of Bioengineering, College park, MD Mentor: Alisa Morss Clyne, Ph.D. & Allan Doctor, M.D. Research: <i>Mechanobiology Effects on Red Blood Cell Nitric Oxide and Extracellular Vesicles, and Endothelial Function</i>	03/2020 – Present
Graduate Student, Purdue University Weldon School of Biomedical Engineering, West Lafayette, IN Mentor: Craig J. Goergen, Ph.D. Research: <i>Dual-modality Photoacoustic and Ultrasound Imaging for Murine Atherosclerosis Characterization</i>	08/2014 – 01/2020
Undergraduate Student (Ronald E. McNair Scholar), Rutgers University Department of Biomedical Engineering, New Brunswick, NJ Mentor: William Craelius, Ph.D. Research: <i>NFC and QR Tag Applications in Exercise-based Hemiplegic Rehabilitative Therapy</i>	05/2013 – 05/2014
Undergraduate Student, Rutgers University Department of Biomedical Engineering, New Brunswick, NJ Mentor: Laura Fabris, Ph.D. Research: <i>Glioblastoma Diagnostics Development using Gold Nanoparticles and Functional Aptamers</i>	08/2013 – 05/2014
Undergraduate Student, Rutgers University Department of Biomedical Engineering, New Brunswick, NJ Mentor: Timothy McGuire, Ph.D. Research: <i>Development of iPrognosis for ADHD and autism diagnosis using interactive iPad games</i>	12/2013 – 05/2014

RESEARCH SUPPORT:

1. American Heart Association Postdoctoral Fellowship	Spring 2022 – Spring 2024
2. University of Maryland President's Postdoctoral Fellowship	Spring 2020 – Spring 2022
3. National Science Foundation Graduate Research Fellowship Program	Fall 2016 – Fall 2019
4. National Institute of Health T32 Diabetes Training Fellowship	Fall 2014 – Spring 2016
5. Aresty Undergraduate Research Fellowship	Spring 2013
6. Louis Stokes Alliance for Minority Participation Grant	Spring 2013

HONORS AND AWARDS:

1. BMES-Cell and Molecular Bioengineering Postdoctoral Research Travel Award	Fall 2023
2. Institute for Bioscience and Biotechnology Research and Robert E. Fischell Institute for Biomedical Devices Travel Fellowship	Fall 2023
3. Nitric Oxide Gordon Conference Poster Award	Spring 2023
4. Rising Star in Engineering in Health	Fall 2022
5. Indiana Clinical and Translational Science Institute Cardiovascular Poster Award	Spring 2020
6. Society for Engineering Science Annual Technical Meeting Silver Paper Award	Fall 2019
7. Purdue Center for Cancer Research (PCCR) Travel Award	Spring 2018
8. Purdue University Joe Bourland Travel Award	Spring 2018
9. Geddes-Laufman-Greatbatch Outstanding Graduate Research Award	Fall 2017
10. Baxter Second Tier Young Investigator Award	Fall 2017
11. 1 st Place Amelia Project Research Elevator Pitch Contest	Spring 2017
12. 3 rd Place American Heart Association Scientific Presentation Award	Spring 2016
13. Ronald W. Dollens Scholarships in Life Sciences Award	Fall 2016
14. Tau Beta Pi Engineering Honor Society	Fall 2013 – Spring 2014
15. Ronald E. McNair Academic Excellence Award	Fall 2014
16. Rutgers University James J. Slade Scholar	Fall 2013 – Spring 2014

PUBLICATIONS: * denotes co-first authorship contributions

1. Tabish, T.A., Zhu, Y., Shukla, S., Kadian S., **Sangha, G.S.**, Lygate, C.A., Narayan, R. (2023) “Graphene nanocomposites for real-time electrochemical sensing of nitric oxide in biological systems.” *Applied Physics Review (Featured Article)*, 10.4, 1-18. <https://doi.org/10.1063/5.0162640>
2. **Sangha, G.S.**, Weber, C.M., Sapp, R.M., Thangaraju, K., Setua, S., Pettebone, M., Doctor, A., Buehler, P.W., Clyne, A.M. (2023) “Mechanical Cues such as Shear Stress and Piezo1 Stimulation Generate Red Blood Cell Extracellular Vesicles.” *Frontiers in Physiology*, 1-16. <https://doi.org/10.3389/fphys.2023.1246910>
3. Weber, C.M., Harris, M., Zic, S.M., **Sangha G.S.**, Arnold, N., Dluzen, D., Clyne, A.M. (2023) “Angiotensin II increases oxidative stress and inflammation in female, but not male, endothelial cells.” *Cellular and Molecular Bioengineering*. 1-15. <https://doi.org/10.1007/s12195-023-00762-2>
4. **Sangha, G.S.**, Hu, B., Li, G., Fox, S. E., Sholl, A. B., Brown, J., Goergen, C. J. (2022) “Assessment of photoacoustic tomography contrast for breast tissue imaging using 3D correlative virtual histology,” *Scientific reports*, 2(1), 1-13. <https://doi.org/10.1038/s41598-022-06501-3>
5. **Sangha, G.S.**, Goergen, C. J., Ranadive, S. M., Prior, S. J., Clyne, A. M. (2021) “Preclinical Techniques to Investigate Exercise Training in Vascular Pathophysiology,” *American Journal of Physiology-Heart and Circulatory Physiology*, 320(4), H1566-H1600. <https://doi.org/10.1152/ajpheart.00719.2020>
6. Zbinden, J.C., Blum, K.M., Berman, A.G., Ramachandra, A.B., Szafron, J.M., Kerr, K.E., Anderson, J.L., **Sangha, G.S.**, Earl, C.C., Nigh, N.R. and Mirhaidari, G.J. (2020) “Effects of Braiding Parameters on Tissue Engineered Vascular Graft Development,” *Advanced Healthcare Materials*, 9(24), 2001093. <https://doi.org/10.1002/adhm.202001093>
7. **Sangha, G.S.**, & Goergen, C. J. (2020) “In Vivo Photoacoustic Imaging and Characterization of Surgically Induced Murine Atherosclerotic Plaques,” *APL Bioengineering (Featured Article)*, 4(2), 026102. <https://doi.org/10.1063/1.5142728>
8. **Sangha, G.S.**, Busch, A., Berman, A., Acuna, A., Chambers, A., Goergen, C. J. (2019) “Effects of Iliac Stenosis on Abdominal Aortic Aneurysm Formation in Mice and Humans,” *Journal of Vascular Surgery*, 56(5), 217-229. <https://doi.org/10.1159/000501312>
9. **Sangha, G.S.**, Hale, N. J., & Goergen, C. J. (2018). “Adjustable photoacoustic tomography probe improves light delivery and image quality,” *Photoacoustics*, 12, 6-13. <https://doi.org/10.1016/j.pacs.2018.08.002>
10. Wodicka, J.R., Chambers, A.M., **Sangha, G.S.**, Goergen, C.J., & Panitch, A. (2017). “Development of a glycosaminoglycan derived, selectin targeting anti-adhesive coating to treat endothelial cell dysfunction.” *Pharmaceuticals*, 10(2), 36. <https://doi.org/10.3390/ph10020036>
11. **Sangha, G.S.**, Phillips, E. H., & Goergen, C. J. (2017). “In vivo photoacoustic lipid imaging in mice using the second near-infrared window.” *Biomedical optics express*, 8(2), 736-742. <https://doi.org/10.1364/BOE.8.000736>
12. **Sangha, G.S.**, & Goergen, C.J. (2016). “Photoacoustic tomography: applications for atherosclerosis imaging.” *Journal of Optics*, 18(8), 084005. <https://doi.org/10.1088/2040-8978/18/8/084005>
13. Lin, J., Phillips, E., Riggins, T. A., **Sangha, G.S.***, Chakraborty, S., Lee, J., ... & Goergen, C.J. (2015). “Imaging of small animal peripheral artery disease models: recent advancements and translational potential.” *International journal of molecular sciences*, 16(5), 11131-11177. <https://doi.org/10.3390/ijms160511131>

MANUSCRIPT SUBMITTED OR IN PREPARATION: * denotes co-first authorship contributions

1. **Sangha, G.S.**, Smith, L.V., Rangachar, N., Weber, C.M., Clyne, A.M., “Piezo1 stimulation increases endothelial and red blood cell eNOS phosphorylation through different mechanisms.” **In preparation.**
2. **Sangha, G.S.**, Sapp, R.M.* , Weber, C.M., Torbit, D., Barnes, A., Rangachar, N., Clyne, A.M., “Female rats exhibit sex-specific perivascular adipose tissue dysfunction in response to a high fat diet.” **In preparation.**
3. Bohlman, S., **Sangha G.S.***, Weber, C.M.* , Moiz B.* , Clyne, A.M., “Statins modify systemic endothelial cell metabolism to enhance endothelial function.” **In preparation.**

PATENTS:

1. Goergen, C. J., **Sangha, G. S.**, Phillips, E. H., & Hale, N. J. (2018). *U.S. Patent Application No. 15/830,716.*

PODIUM PRESENTATIONS:

1. **Sangha, G.S.**, Smith, L.V., Kheradmand-Hajibashi, M., Rangachar, N., Clyne, A.M., “Red Blood Cell Piezo1-PKC-eNOS Pathway as a Novel Engineering Target to Enhance Vascular Health.” Biomedical Engineering Society, Cellular and Molecular Bioengineering. San Juan, Puerto Rico. January 2024.
2. **Sangha, G.S.**, “Going with the Flow: The Evolving Role of Red Blood Cell Mechanosignaling in Vascular Health and Disease.” BME Underrepresented Needs in Technology and Engineering Seminar Series. Virtual. September 2023.
3. **Sangha, G.S.**, Smith, L.V., Clyne, A.M., “Mechanosensitive Piezo1 Stimulation Increases Endothelial and Red Blood cell Nitric Oxide via Different Pathways.” Nitric Oxide Gordon Research Seminar. Ventura Beach, California. February 2023.
4. **Sangha, G.S.**, Weber, C.M., Sapp, R.M., Pettebone, M., Clyne, A.M., “Mechanical Cues Such as Shear Stress and Piezo1 Stimulation Generate Red Blood Cell Extracellular Vesicles” SB3C. Cambridge, Maryland. June 2022.
5. **Sangha, G.S.**, “The Evolving Role of Exercise-Induced Extracellular Vesicles in Cardiovascular Disease” GradTerp Exchange. College Park, Maryland. May 2021.
6. **Sangha, G.S.**, Goergen, C.J., “Atherosclerosis Characterization Using Lipid-Specific Photoacoustic Imaging and 4D Ultrasound Strain Mapping in Mice,” Acoustic Society of America. Louisville, Kentucky. May 2019.
7. **Sangha, G.S.**, Goergen, C.J., “*Ex Vivo* Vibrational Photoacoustic Tomography Characterization of Murine Atherosclerosis,” Biomedical Engineering Society Annual Meeting. Atlanta, Georgia. October 2018.
8. **Sangha, G.S.**, Hu, B., Bolus, D., Wang, M., Skidmore, S., Sholl, A.B., Brown, J.Q., Goergen, C.J., “Multi-Modality Photoacoustic Tomography, Ultrasound, and Light Sheet Microscopy for Volumetric Tumor Margin Detection,” SPIE Photonics West. San Francisco, California. January 2018.
9. **Sangha, G.S.**, Hale, N., Goergen, C.J., “Motorized Photoacoustic Tomography Probe for Label-Free Improvement in Image Quality,” SPIE Photonics West. San Francisco, California. January 2018.
10. **Sangha, G.S.**, Goergen, C.J., “Vibrational Photoacoustic Tomography for *In Vivo* Lipid Imaging,” Medical Physics Seminar. West Lafayette, Indiana. May 2017.
11. **Sangha, G.S.**, Hale, N., Wang, M., Ginsberg, H., Brown, J.Q., Goergen, C.J., “Photoacoustic Tomography for Tumor Margin Assessment,” Amelia Project Annual Meeting. Kokomo, Indiana. April 2017.
12. **Sangha, G.S.**, Goergen, C.J., “Vibrational Photoacoustic Tomography for *In Vivo* Lipid Imaging.” Biomedical Engineering Summer Seminar. West Lafayette, Indiana. August 2016.
13. **Sangha, G.S.**, Phillips, E.H., Berlant, C., Goergen, C.J., “Optimization of Vibrational Photoacoustic Imaging for *In vivo* lipid Imaging,” American Heart Association Chicago Research Network Symposium: Translational Research in Cardiovascular Disease: From Bench to Bedside. Chicago, Illinois. September 2016.
14. **Sangha, G.S.**, Fabris, L., “Biosensing Platform for Detecting and Monitoring Circulating Tumor Cells,” AGER Undergraduate Research Symposium. Rutgers University-New Brunswick, May 2014.
15. **Sangha, G.S.**, Fabris, L., “Biosensing Platform for Detecting and Monitoring Circulating Tumor Cells,” 2014 Annual Aresty Research Symposium. New Brunswick, New Jersey. May 2014.
16. **Sangha, G.S.**, Amalan, K., Shah, S., Ali, J., “iPrognosis,” Rutgers Biomedical Engineering Senior Design Symposium. New Brunswick, New Jersey. May 2014.
17. **Sangha, G.S.**, Craelius, W., “Application of NFC and QR Tags in Rehabilitative Therapy,” 21st Annual McNair Scholars National Research Conference. Baltimore, Maryland, September 2013.
18. **Sangha, G.S.**, Craelius, W., “Application of NFC and QR Tags in Rehabilitative Therapy,” Ronald E. McNair Post- Baccalaureate Achievement Symposium. New Brunswick, New Jersey. July 2013.

POSTER PRESENTATIONS:

1. **Sangha, G.S.**, Smith, L.V., Kheradmand-Hajibashi, M., Rangachar, N., Weber, C.M., Clyne, A.M., “Red Blood Cell Mechanical Stimulation via Piezo1 as a Novel Target to Enhance Vasculoprotective Nitric Oxide Bioavailability.” Biomedical Engineering Society Annual Meeting. Seattle, Oregon, October 2023.
2. **Sangha, G.S.**, Smith, L.V., Clyne, A.M., “Mechanosensitive Piezo1 Stimulation Increases Endothelial and Red Blood cell Nitric Oxide via Different Pathways.” Nitric Oxide Gordon Research Seminar. Ventura Beach, California. February 2023.
3. **Sangha, G.S.**, Sapp, R.M., Clyne, A.M., “Mechanosensitive Piezo1 Stimulation Increases Red Blood Cell and Endothelial Cell Nitric Oxide Through Different Pathways” Biomedical Engineering Society Annual Meeting. San Antonio, Texas. October 2022.

5. **Ronald E. McNair Post-Baccalaureate Program Ambassador** Fall 2013 - Spring 2014
Rutgers University, New Brunswick, NJ
- Assisted as student representative for the McNair Post-Baccalaureate Program.
 - Served as an advocate on behalf of the program to legislators, public and university officials.
 - Organized recruitment events and interviewed students interested in the McNair program.

MENTORING AND TEACHING:

1. **BioE 689K/489V Cardiovascular Engineering**
 - Developed Course-Based Undergraduate Research Experience (CURE) Fall 2020
 - Guest Lecturer Fall 2020, 2021, 2022
2. **Mentored 13 Trainees in Research** (69% women; 32% underrepresented/disadvantaged background)
 - Lauren Smith, *Graduate Student* Fall 2022 – Present
 - Marzyeh Kheradmand-Hajibashi, *Graduate Student* Fall 2022 – Present
 - Paige Boyland, Undergraduate Student Fall 2022 – Present
 - Donaysia Delara Torbit, Undergraduate Student Summer 2022 - Present
 - Xavier Garcia, Undergraduate Student Fall 2021 – Present
 - Nimisha Rangachar, Undergraduate Student Fall 2021 – Present
 - Annie Barnes, *Honors Thesis Undergraduate Student; NSF-GRFP Awardee* Summer 2021 – Spring 2023
 - Morgan Pettebone, *Honors Thesis Undergraduate Student* Fall 2020 – Fall 2022
 - Alex Kevin Yeh, Undergraduate Student Spring 2019 – Summer 2019
 - Shelby Skidmore, Undergraduate Student Spring 2017 – Fall 2017
 - Nick Hale, Undergraduate Student Spring 2016 – Summer 2016
 - Hannah Ginsberg, Undergraduate Student Spring 2016 – Summer 2016
 - Corey Berlant, Undergraduate Student Fall 2015 – Spring 2016
3. **TRiO Student Support Services Tutor** Fall 2012 – Spring 2014
 - Provided tutoring to 26 undergraduate students from underrepresented and disadvantaged backgrounds.
 - Helped students grasp fundamental pre-calculus, biology, and chemistry concepts.

PROFESSIONAL MEMBERSHIPS:

- Biomedical Engineering Society
- American Heart Association
- American College of Sports Medicine
- American Physiological Society

TECHNICAL SKILLS:

- Animal: Small animal vascular surgery to study atherosclerosis, deep vein thrombus, aneurysms
- Preclinical Imaging: Small animal ultrasound and photoacoustic tomography
- Mechanistic Toolkit: Cell culture, Western blot, RT-PCR assays to quantify endothelial dysfunction hallmarks
- Flow Chambers: Pressure myography, parallel plate flow chamber, cone and plate flow chamber, red cell shearing
- Extracellular Vesicles: Isolation, purification, and characterization from plasma, cells, and bulk tissue
- Exercise Intervention: Small animal treadmill training and acute human aerobic exercise testing
- Computational: HemoCell simulations of circulating cells
- Programming: MATLAB
- Exposure: Magnetic resonance imaging, DNA extraction, Java programming, SimVascular