Tod Policandriotes

Dr. Tod Policandriotes;Email: todpoli@gmail.com, US citizen

Experience

Owner, PoliSci Technologies, www.poliscitechnologies.com
March 2023 - Present

Chief Technologist, High Temperature Composite materials– Collins Aerospace/Raytheon Technologies
July 2019 – March 2023
UCONN Research/Teaching Faculty (vol. appt.), IMS 2017 – 2023

- High temperature (HTC), CMC and ultra high temperature (UHTC) composite R&D
- CVI process research/development/production
- Hypersonic/brake materials and structures R&D/manufacturing/production
- Designed CVI systems and components
- Developed and managed projects/team/mentoring/training
- Data analysis/root cause analysis
- Material testing and analysis
- Educational course instruction - Physics of CVI processes and grad students in this area.
- Publications and Patents/Applications
- 27 years of design, development and construction of rough to high vacuum systems/furnaces

Sr. Manager, High Temperature Composite materials – Collins Aerospace/Raytheon Technologies
July 2017 – July 2019

- High temperature (HTC), CMC and ultra high temperature (UHTC) composite R&D – brakes, turbine blades, structures.
- CVI process R&D/manufacturing/production
- Designed CVI systems and components
- Developed and managed team/projects/mentoring/training
- Data analysis/root cause analysis
- Material testing and analysis
- Educational course instruction - Physics of CVI processes and grad students in this area.
- Publications and Patents

Sr. Engineer, High Temperature Composite materials – UTC Aerospace
Nov. 2016 – July 2017

- High temperature (HTC) and CMC composite R&D - brakes
- CVI process R&D and production
- Designed CVI systems and components
- Worked on Projects/mentoring/training
- Data analysis/root cause analysis
- Material testing and analysis
- Patents

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Assistant Scientist/NTT Faculty/Chief Safety Officer - Southern Illinois University
June 2004 – October 2016

- 20 years developing new C/C and many other composite friction materials for government and industry using nanotechnology and standard technologies. Development of aerospace aircraft C/C structural composites.
- Designed and built a pilot scale CVI system for making C/C, SiC, BN, B_4C, ZrB_2 and ZrC. Made the materials. Melt infiltration techniques.
- Coordinate and conduct research on friction materials and provide research design support/teaching for all engineering students, staff and faculty in the college of engineering.
- 18 years of experience with Link dynamometers, friction testing equipment and friction material testing (many devices), including all thermal instruments and mechanical testing.
- Experimentation with nanoscale self assembly techniques.
- Built a new design small scale fully functional CVI/CVD system at home. Carbon-carbon and coatings. Patented and purchased by Collins Aerospace/Raytheon.
- Operate, Repair, maintain, and/or improve ANY advanced scientific equipment.
- Design and aid in the design of all scientific equipment and systems used in the college of engineering. If necessary, design in Autocad/inventor or Solidworks and build it myself.
- 23 years of machining experience, machined high precision components for many applications and built systems.
- Lifetime experience in data analysis techniques/software/programming
- Fluent in Solidworks, Autocad and Labview.
- 8+ years of experience in SEM and TEM microscopy, polarized light microscopy, Raman, etc
- 23 years of experience in welding and machining.
- Teaching experience in properties of materials, nanotechnology, manufacturing methods, mechanics of materials, thermal physics, friction science and materials science. Senior Design.
- Experimentation growing/depositing carbon/elemental structures under various conditions. ie; diamond, graphite, nanofibers, nanotubes, nanocoils, etc.

Researcher I-III - Southern Illinois University
May 1998 – June 2004 (6 years 2 months) Center for Advanced Friction Studies

- Conduct independent research on friction materials and provide research design support for all staff and faculty at the Center.
- Teach UG and Graduate students
- Operate, Repair, maintain, and/or improve scientific equipment used in the labs.
- Design and aid in the design of all scientific equipment and systems used in the Center.
- Obtained extensive knowledge and intuitive abilities in systems design and integration.

Graduate Research Assistant - Southern Illinois University
August 1996 – May 1998 (1 year 10 months) Center for Advanced Friction Studies

- Usage and maintenance of scientific equipment used in C-C composite research.
- Experimental research and thesis on C-C composite surfaces.
- Designed and constructed equipment and developed software for the acquisition of data and its analysis.
- Subscale Aircraft dynamometry, instron/MTS mechanical testing, profilometry, microscopy

- Acquired extensive computer knowledge in programming, interfacing and integrating apparatus to pre-existing equipment, and software.

Equipment Manager/Technician - A.I.S
May 1995 – August 1996 (1 year 4 months)

- Developed performance verification procedures for ISO9000 certification.
- Designed and constructed tool and die equipment for in-house production and produced the seals.
- Diagnosis and repair of scientific research equipment including custom improvement modifications.

Current Research and Development (Home lab)

- Plasma Experimentation in Methane

Publications

[1] T. Policandriotes, E.-K. Khor and D. Marx, "Application of fractals to the contact of carbon-carbon surfaces," *Journal of applied physics,* vol. 100, no. 112, p. 9, 2006.

[2] T. Policandriotes and P. Filip, "Effects of selected nanoadditives on the friction and wear performance of carbon-carbon aircraft brake composites," *Wear,* vol. 271, no. 9-10, pp. 2280-2289, 2011.

[3] T. Policandriotes and D. Bortz, "Friction performance and thermal analysis of carded and needlepunched kevlar felt-reinforced/polyimide matrix composite friction materials," *SAE transactions journal of materials and manufacturing,* vol. 114, no. 5, 2005.

[4] T. Policandriotes, R. Dinwiddie, D. Marx, S. Zhang, H. Wang and J. Scott, "Measurement of interfacial temperature during testing of a subscale aircraft brake dynamometer," *Journal of physics D,* vol. 34, no. 6, p. 976, 2001.

[5] Y. Lu, T. Policandriotes and M. Wright, "Modeling wear traces of auotmotive friction materials by cantor set," *Tribology Transactions,* 2002.

[6] Masters Thesis, “Surface Characterization and Evolution of Sub-scale Brake Materials” 1998 , SIU

[7] PhD Dissertation, “DESIGN OF AN EFFICIENT AND RAPID CHEMICAL VAPOR INFILTRATION (CVI) RE-CIRCULATION SYSTEM”, 2013, SIU

23 publications on Researchgate on materials.

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Patents and Applications

- Composite Friction Materials Having Carbon Nanotube and Carbon Nanofiber Friction Enhancers
- Systems and methods for chemical vapor infiltration and densification of porous substrates: Patent number: 10648075
- Magneto-rheological fluids work piece holding apparatus and method
- Silane recirculation for rapid carbon/silicon carbide or silicon carbide/silicon carbide ceramic matrix composites: Patent number: 11255015
- Irregular shaped electromagnetic materials (application)
- Hybrid Axial/Radial Motor: Publication number: 20220320981

Education

Southern Illinois University
Ph.D, Engineering Science (Physics, ME, MatSci, 3.6/4.0
1998 – 2013

Southern Illinois University
M.S, Physics, 3.8/4.0
1996 – 1998

Southern Illinois University
BS, Physics, 3.8/4.0
1993 – 1995

Southeastern Illinois College
Associate of Applied Sciences (AAS), Engineering/industrial machining, 4.0/4.0
1991 – 1993

Additional Skills & Expertise

Strong hands-on mechanical and electrical aptitude, Welding, Machining, ceramics, tool and die design/machining, Explosives, Explosives Safety, Explosive Ordnance Disposal, Propulsion Technology, PCB design/fabrication, Electronics, Chemical Safety, ACE and CORE. Work on my own cars and I like getting my hands dirty.