

# *Curriculum vitae*

**Richard G. Rateick, Jr., PE**

South Bend, Indiana, 46637

Voice: 574.252.9294

Web site: [www.rexp2.com](http://www.rexp2.com)

e-mail: [rateick@rexp2.com](mailto:rateick@rexp2.com)

---

## **Summary of Technical Expertise:**

- Diverse research portfolio management: broad new materials and mechanical systems development involving wide range of physical, chemical, and engineering disciplines.
- Principle investigator responsible for internally funded \$2.6M annual research budget.
- 2020 External funding: Co-PI ONR Contract: \$1.65M, option for \$1.35M; team member CESMI grant \$764K; NSERC Canada CRD Grant \$270K.
- Industry & University teaming: building multidisciplinary consortia for technology transfer, transition, development, problem solving, and monetization:
  - Carbon-carbon aircraft brake life multi-scale model development: mechanics, University of Illinois; oxidation, University of Calgary; tribology, Purdue University, combined model, Honeywell.
  - Variable displacement axial piston jet fuel pump multi-scale lubrication model: Tribology, Purdue University; Cavitation, Notre Dame; combined model, Honeywell. Won ONR funding with no cost share.
  - Intrinsically damped electroformed bellows for hermetic sealing electromagnetic servo valves: mechanics multi scale modeling, University of Illinois; electrochemistry and coatings, University of Calgary; manufacturing, Stentech. Won NSERC CRD grant, partial funding.
- Invited lecturer to universities, industry and government funding agencies on how to make these relationships work for all involved.
- Applied research and development experience while co-located in an aerospace propulsion control and brake product development engineering organization. Developed materials for material enabled products for commercial (CF6, CFM56, HTF7000) and military (F404, F414, F100, F119, F135) engine fuel systems. Developed anti-oxidant coatings and structure property process models for Carbon-Carbon composite aircraft brakes for commercial and military applications (A380, A330, F-18, JSF).
- Managed and performed multi-scale experiment & modeling: deterministic and probabilistic mechanical property (tensile, fatigue, fracture mechanics, creep), corrosion, thermophysical properties of metal, carbon-carbon composite, ceramics and coatings. Emphasized mechanisms to explain influence of operating environment.
- Developed enabling tribological material and lubrication experiment and modeling for low lubricity wear and friction in valves, actuators, pumps, pistons, and bearings and controlled friction in C-C brakes.
- Materials: superalloys (Waspaloy, Haynes 25, Inconel, Ultimate), aluminum (Al-Cu, Al-Si-Mg, Al-Sc; Al-Li, Al-Fe-V-Si, Al-Be), titanium (alpha-beta, metastable beta, aluminides), refractory metals (W, Re, Nb, Mo), refractory carbides, magnesium (WE43), ceramics (silicon nitride, zirconia, zirconia toughened alumina, alumina, silicon carbide, ytterbium disilicate); glass (phosphate, lanthanide), carbon-carbon (CVI/CVD and pitch densified), coatings (TiN, Ti-C-N multilayer, B, Ni-Re, Ni-Co, Co-W, Co-P) processes (CVD, CVI, PVD, alloy electrodeposition, anodizing, spray forming, rapid solidification, sintering).

## **Education:**

- **Master of Science in Materials Science & Engineering**  
University of Notre Dame, 1995  
Thesis: Thermo-mechanical processing and crystallographic texture in super alpha-2 titanium aluminide.
- **Bachelor of Science in Mechanical Engineering with Chemistry second major**  
Valparaiso University, 1986  
Senior Project: Digital automation of a gas chromatograph for combustion product analysis
- Ohio University, Fall 1986
- Professional Engineer, Indiana

## **Employment:**

### **University of Illinois at Urbana-Champaign (October 2020-present)**

- Adjunct Research Assistant Professor of Mechanical Science and Engineering

- Nuclear graphite post irradiation mechanical behavior research.

### **REXP2 Research LLC (August 2020-present)**

#### **• Owner/president**

- Consulting services
  - Wettability and electro wettability of nano materials (ceramics, carbon/graphite, polymers).
  - Proposal writing: additive manufacturing of composites;
  - Pursuing SBIR/STTR grants for mechanical, biomedical, and chemical product R&D.

### **Honeywell Aerospace (1987 to May 2020)**

#### **• Sr. Principal Engineer/Scientist (2001-Present)**

- Promoted based on demonstrated performance transitioning new materials from research to critical program winning products: F-35 Joint Strike Fighter STOVL actuation and engine (F135) control systems.
- Industry-University collaboration
  - Fundamental objective: develop and transition tech. from NASA TRL 1 to TRL 4, practical limit for Universities.
  - Mentored: 8 Post Docs, 11 PhDs, 7 MSs at 6 universities; 40 interns/coops and inspired 4 to pursue PhDs.
  - Proposed and won \$1.65M from the Office of Naval Research for axial piston pump fuel lubrication and cavitation research. Collaboration with Purdue and Notre Dame.
  - Proposed and won matching funding (\$270K) from Canada's NSERC; partners: University of Calgary, Stentech; intrinsically damped electroformed nickel-cobalt bellows for servo valves; patented background technology; objectives: reduce part count; reduce null shift; hermeticity.
  - University of Illinois, Urbana-Champaign: multi scale modeling of carbon-carbon fatigue crack growth: establish process-structure-property relationships based on crack growth with DIC, nano-indentation, micro CT and molecular dynamics. Discovered new stress induced graphitization mechanism.
  - University of Illinois, Urbana-Champaign: multi-scale modeling of fatigue crack growth using molecular dynamics of nano crystalline electroformed Ni-Co, based on TEM, EBSD and fatigue crack growth experiments.
  - University of Calgary: developed combined spark anodization and parylene coating process for corrosion protection of large cross section AA2219 aluminum. Eliminated 40 % fatigue strength loss inherent to conventional anodizing.
  - University of Calgary: developed spark anodization method for magnesium alloy WE43 with FOD resistant CVD Parylene-HT coating as a seal.
  - Purdue University; rolling element hybrid bearing life model for jet fuel vs. oil lubrication: 60 % less life reduction than bearing industry expectations; cut weight and size of axial piston fuel pumps and motors.
  - Purdue University: variable displacement fuel pump component lubrication models for surface pockets for robustness under starved lubrication; system dynamics of rotor port plate interface; multi student.
  - Southern Illinois University: developed new phosphate glass antioxidant coating for carbon-carbon brakes; doubled thermal and catalytic oxidation protection; reduced migration to friction surface.
  - University of Calgary: modeled oxidation mechanisms of carbon-carbon composites based on high resolution SEM imaging, electrochemical and gas phase oxidation data: established a nano-scale structural basis for coating transport and adhesion that explains differences in catalytic and thermal oxidation behavior in aircraft brakes, critical for optimizing AO and substrate chemistry/structure.
  - Notre Dame: developed cavitation bubble formation and collapse model for jet fuel to predict onset for design mitigation; predict bubble collapse to control erosion; variables: chemistry, geometry, nucleants.
  - University of Calgary: hexavalent chrome replacement coatings: Ni-Re, Co-W. Transitioned to Honeywell for scale up and extended to Ni-W and Co-P; aerospace and down hole applications.
- Industry-National Laboratory collaboration
  - Sandia National Laboratory: constitutive model for braze alloys to join titanium to silicon nitride using a compliant interlayer structure; 60 % cost reduction using ceramic for wear and metal for structure.
  - Oak Ridge National Laboratory HTML user program: experimental design models for alumina ceramic tubular components.
  - Argonne National Laboratory: solid particle erosion of materials for contamination robustness in fuel systems; multi-year summer project, supporting BS Physics students between undergrad and grad school.
- Internal research and development
  - Consistently won Honeywell Grants for Innovation and Growth (\$75K, 6 months): COPNA resins for C-C densification (patented); hydrophobic coatings for phosphate glass and C-C (patented); vibration assisted particulate infiltration of C-C prior to pitch densification (patented); Lignin for carbon fiber precursors (2 project wins); Chemical cross linking of pitch for high throughput C-C densification.

- Implemented Beta-C titanium spring technology in gas turbine fuel controls for reduced weight and size. Published first elevated temperature fatigue and elasticity study on Beta-C titanium springs. Developed JSF qualification test procedure still in use 15 years later.
- Discovered and first published the mechanism for a new failure mode of severe (40 %) fatigue strength loss following anodization of large cross section rolled and forged aluminum-copper alloys.
- Researched polymer (Parylene) sealing methods for anodized aluminum and magnesium, including cost vs. performance modeling as function of coating thickness.
- Lead team developing ceramic antioxidant coatings for carbon-carbon capable of 1600 °C performance in aircraft brakes and hypersonic vehicles. Patent pending.
- Applied probabilistics to the specification method for ceramic materials to reduce discrepant material actions (MRB) over 95 %. Developed Probability of Detection (POD) verification procedure for non destructive testing of JSF fuel system raw materials.
- Consulted (2 years) for Honeywell Turbo-Technologies (Garrett Motion) and Caterpillar on main journal bearing seizures in large engine turbochargers; determined root cause; developed chemical kinetics research plan with University of Dayton for mitigation; saved many million dollars in warranty expenses.
- Led Honeywell engineering recruiting efforts at Midwest universities. Honeywell University Relations Campus Manager: University of Notre Dame, University of Illinois. Mentored interns, new hires, and graduate students. Site coordinator/mentor for a 20 person intern program. Collaborated with HR to develop training for engineers who would interview new graduate and intern candidates first round.

**Principal Engineer (1999-2000)**

- Developed and transferred enabling tribological materials technology to design engineers for fuel powered actuation of the F-35 Joint Strike Fighter STOVL aircraft engine (F135-PW-600) thrust vectoring three bearing swivel nozzle (3BSN) and roll post actuator; critical to contract win and retention (lost business twice on cost, won back after competitor failures). 3BSN was 2nd highest risk system in JSF in development.
- Implemented probabilistic design methodology and infrastructure for highly stressed structural ceramics (silicon nitride, alumina) for use in prime reliable and flight critical components. Trained design engineers to design for ceramics considering fast fracture and time/cycle dependent fracture modes.
- Lead production implementation and supplier development for ceramics, PVD coatings and advanced metallics in axial piston motors.

**Senior Staff Engineer (1996-1998):**

- Developed design and tribological data for ceramics, PVD coatings and advanced metallics for tribological applications in jet fuel powered axial piston motors for engine actuation. Received AlliedSignal Technical Achievement Award for success.
- Developed probabilistic design data for silicon nitride ceramics for pressure vessels. Lead probabilistic analysis tool selection, experimental performance evaluation, and training.
- Saved \$1M/year by solving critical hot short cracking problem in leaded bronze cast into steel through metallographic and early 20<sup>th</sup> century historical literature research. Developed mechanical and tribological property data for alternative alloys to bronze materials which were no-longer available.
- Oak Ridge National Laboratory HTML; wrote accepted proposal to perform neutron diffraction at HFIR on bronze bonded to steel in aircraft hydraulic motors to measure residual stress and stop cracking.

**Senior Engineer (1991-1995):**

- Designed functionally gradient electroplated refractory metal-nickel tribological and diffusion barrier coatings for NASP (hypersonic) hydrogen control valves. Built controlled atmosphere diffusion bond test capability.
- Began a multi-year summer research collaboration with Argonne National Laboratory on particle erosion of metals, ceramics, and coatings. Recognized by ANL as an example of technology transfer leading to \$100K/year cost savings on government contracts (F119 engine for F-22 Advanced Tactical Fighter).
- Automated the tribology laboratory reducing labor by 60%. Outsourced mechanical, thermophysical and crystallographic property testing for improved throughput and reduced cost.
- Transitioned aluminum-lithium alloy AA8090 and high temperature aluminum alloy AA8009 from corrosion, fatigue, and fracture research to gas turbine engine fuel control and actuator pressure vessel applications.
- Developed prototype zirconia toughened alumina and silicon nitride valves for gas turbine fuel controls.
- Oak Ridge National Laboratory High Temperature Materials Laboratory User Program participant: high temperature cyclic, dynamic, and static fatigue in silicon nitride, X-ray residual stress to quantify machining damage, nano-indentation hardness of hard anodize coatings on aluminum as it related to solid particle erosion research performed at Argonne National Laboratory;
- Initiated research on corrosion protection of magnesium WE43 with U. Calgary and Notre Dame. Developed mechanical property (tensile, creep, fatigue) data base for WE43. Developed FOD resistant coatings.

**Engineer (1988-1990):**

- Principal Investigator of the Advanced Materials Internal Research and Development Program: Ceramics for fuel and gas valves, light weight metals, high temperature materials. Consistently achieved scores in top 5% of the business unit for government technical reviews of IR&D activity.
- Developed mass spectrometer hydrogen gas seal test apparatus for use up to 840 °C.
- Designed and built high temperature tribometer for use to 1100 °C.
- Proposed and executed Collaborated with University of Massachusetts on hot erosion and strength loss in silicon nitride.

**Associate Engineer (1987):**

- Wrote proposals for hot hydrogen and oxygen valves for the hypersonic National Aerospace Plane (X-30)  
Performed flow vs. size study to minimize system weight.

**Awards:**

- 2020 STLE - Walter D. Hodson Award Richardson, D., Sadeghi, F., Rateick, R., Rowan, S., "Dynamic Modeling of Floating Valve Plate Motion in an Axial Piston Pump" Tribology Transactions, Vol 61(4), pp. 683-693, 2018.
- 2014 STLE - Walter D. Hodson Award: Cross, A.T., Sadeghi, F., Cao, L., Rateick, R.G., and Rowen, S., "Flow Visualization in a Pocketed Thrust Washer," Tribology Transactions, 55:5, 571-581, 2012.
- 2013 Honeywell Technical Achievement Award: Chrome replacement electroplate coating development
- 2012 STLE Tribology Transactions, Surface Engineering Best Paper Award: Wang, C., Sadeghi, F., Wereley, S. T., Rateick, R. G., and Scott, R., "Experimental Investigation of Lubricant Extraction from a Micropocket," STLE Tribology Transactions, Vol. 54(3), pp. 404-16, 2011
- 2002 Honeywell Technical Achievement Award: "For outstanding and innovative contribution to the development of Three Bearing Swivel Duct," 2002.
- 1997: AlliedSignal Technical Achievement Award, "For outstanding contribution to AlliedSignal Inc. in the field of Advanced Materials for Low Lubricity Metering and Actuation Applications."
- First Place and Highest Technical Content awards for senior project presentation, American Society of Mechanical Engineers, Region VII Student Member Competition (1986). Topic: Computer Aided Chromatography.

**Continuing Education (Teacher and student highlights):**

- Taught: Ashby methods for material selection and design (ASM)
- Taught: Steel Making from 1850-1920 (ASM, Notre Dame Chapter)
- Taught: Corrosion, a historical to state of the art approach based on the Evans' electrochemical theory. (ASM, Notre Dame Chapter)
- Invited lecturer at the University of Calgary and Notre Dame on creating win-win University-Industry collaborations.
- Taught: Senior Design Project, Materials Science and Engineering, Notre Dame. Materials for diffusion barriers.
- Fatigue and Fracture basic and advanced courses, early and late courses (University of Illinois)
- Weibull & Log Normal Distribution Class (SAE)
- CARES Probabilistic Design for Ceramics
- Ceramics Mechanical Design (American Ceramic Society)
- Lean Manufacturing (University of Tennessee),
- Design for Six Sigma (Honeywell)

**Patents:**

- 2 patents pending, 2 disclosures in review, 2 patent applications abandoned due to prior art and business case.
1. Electrohydraulic valve including a vibration-resistant, flexible hermetic seal, U.S. Patent 10,197,178, R.Rateick, D. Laboda, February 2019.
  2. Segmented carbon fiber preform, R.G. Rateick, Jr., U.S. Patent 10,144,675, December 2018.
  3. Vibration assisted densification of a carbon fiber preform, G. Seminara, R.G. Rateick, Jr., U.S. Patent 10,151,026, December 2018.
  4. Carbon-carbon composite including hydrophobic coating, R.G. Rateick, Jr., S.F. Yates, U.S. Patent 10,119,585, November 2018.
  5. In-line continuous flow liquid-gas separator-pump, D.J. Laboda, R.G. Rateick, Jr., C. Gedeon, G.A. Valencourt, U.S Patent 9,897,100, February 2018.
  6. Oxidation catalyst detector for aircraft components, R.G. Rateick, Jr., U.S. Patent 9,678,029, June 2017
  7. Aircraft brake health monitoring system and method, D. Mylaraswamy, A.P. Vechart, M.E. Behnke, R.G. Rateick, Jr., E.O. Nwadiogbu, G. Horban, M. Brown, U.S. Patent 9,242,628, January 2016.

8. Piston-to-shoe interface lubrication method, R.G. Rateick, W.S. Rowan, L. Portolese, U.S. Patent 9,212,656, December 2015.
9. Axial piston pump auxiliary cam assembly, R.G. Rateick, L. Portolese, W.S. Rowan, European Patent 2 423 505, February 2012.
10. Cladded axial motor/pump piston and method of producing same, R.G. Rateick, Jr., U.S. Patent 7,428,862, September 2008
11. Split ceramic bore liner, rotor body having a split ceramic bore liner and method of lining a rotor bore with a split ceramic bore liner, R.G. Rateick, Jr., D.A. Hall, L.A. Portolese, S.T. Wakeman, U.S. Patent 7,469,626, December 2008.
12. Selectively cold worked hydraulic motor/pump shoe, R. G. Rateick, Jr., L.A. Portolese, U.S. Patent 7,025,182, April 2006.
13. Selectively cold worked hydraulic motor/pump shoe, R. G. Rateick, Jr., L. A. Portolese, U.S. Patent 6,802,916, October 2004.
14. Method for making parts usable in a fuel environment, R.G. Rateick, Jr., U.S. Patent 5,728,475, March 1998.
15. Thermally activated joint, R.G. Rateick, Jr., D.A. Hall, U.S. Patent 5,056,950, October 1991.

**Publications:**

- h-index: 20 on [Google Scholar](#)

1. "Surface modification effects on lubricant temperature and floating valve plate motion in an axial piston pump" *Proc. Institution of Mechanical Engineers, J: Journal of Engineering Tribology*, [234] (1) 3-17 (2020) D. Richardson, F. Sadeghi, R.G. Rateick, Jr., S. Rowan.
2. "Interface Graphitization of Carbon-Carbon Composites by Nanoindentation" *Carbon* [120] 425-435 (2019) A.S.K. Mohammed, H. Sehitoglu, R.G. Rateick, Jr.
3. "Using  $\mu$ PIV to Investigate Fluid Flow in a Pocketed Thrust Bearing" *Tribology Transactions* in press (2019) D. Richardson, F. Sadeghi, R.G. Rateick Jr, S. Rowan.
4. "Damage tolerance of carbon-carbon composites in aerospace application" *Carbon* [126] 382-393 (2018) P. Chowdhury, H. Sehitoglu, R. Rateick.
5. "Dynamic Modeling of Floating Valve Plate Motion in an Axial Piston Pump" *Tribology Transactions* [61] (4) 683 (2017). D. Richardson, F. Sadeghi, R.G. Rateick Jr, S. Rowan.
6. "Experimental and analytical investigation of floating valve plate motion in an axial piston pump" *Tribology Transactions* [60] (3) 537-547 (2017) D. Richardson, F. Sadeghi, R.G. Rateick Jr, S. Rowan.
7. "New insights into the early stages of thermal oxidation of carbon/carbon composites using electrochemical methods" *Carbon* [108] 178-189 (2016) C. Zhang, M. Chen, S.C. Paulson, R.G. Rateick Jr, V.I. Birss.
8. "Recent advances in modeling fatigue cracks at microscale in the presence of high density coherent twin interfaces" *Current Opinion in Solid State and Materials Science* [20] (3) 140-150 (2016) P. Chowdhury, H. Sehitoglu, R. Rateick.
9. "Strength prediction in NiCo alloys—the role of composition and nanotwins" *International Journal of Plasticity* [79] 237-258 (2016) P. Chowdhury, H. Sehitoglu, H.J. Maier, R. Rateick.
10. "Role of nanotwins on fatigue crack growth resistance—experiments and theory" *International Journal of Fatigue* [84] 28-39 (2016) S. Alkan, P. Chowdhury, H. Sehitoglu, R.G. Rateick, H.J. Maier.
11. "Temperature distribution in pocketed thrust washers" *Tribology Transactions* [58] (1) 31-43 (2015) A.T. Cross, F. Sadeghi, R.G. Rateick Jr, S. Rowan, D. Laboda.
12. "Predicting fatigue resistance of nano-twinned materials: Part I—Role of cyclic slip irreversibility and Peierls stress" *International Journal of Fatigue* [68] 277-291 P.B. Chowdhury, H. Sehitoglu, R.G. Rateick.
13. "Predicting fatigue resistance of nano-twinned materials: Part II—Effective threshold stress intensity factor range" *International Journal of Fatigue* [68] 292-301(2014) P.B. Chowdhury, H. Sehitoglu, R.G. Rateick.
14. "Hydrodynamic pressure generation in a pocketed thrust washer" *Tribology Transactions* [56] (4) 652-662 (2013) A.T. Cross, F. Sadeghi, R.G. Rateick Jr, S. Rowan.
15. "Modeling fatigue crack growth resistance of nanocrystalline alloys" *Acta Materialia* 61 (7), 2531-2547 (2013) P.B. Chowdhury, H. Sehitoglu, R.G. Rateick, H.J. Maier.
16. "Effect of AC/DC Spark Anodization Current and Time on the Oxidation of an Al-Cu Alloy" *Journal of The Electrochemical Society* [160] (8) C369-C379 (2013) E. Alsrayheen, B. Campbell, R. Rateick, V. Birss.
17. "Flow visualization in a pocketed thrust washer" *Tribology Transactions* [55] (5) 571-581 (2012) A.T. Cross, F. Sadeghi, L. Cao, R.G. Rateick Jr, S. Rowan.
18. "One-step synthesis of a multi-functional anti-oxidation protective layer on the surface of carbon/carbon composites" *Carbon* [50] (2) 557-565 (2012) Y.C. Lin, E.M. Ruiz, R.G. Rateick Jr, P.J. McGinn, A.S. Mukasyan.
19. "Exploring the effect of alkaline silicate solution composition on the ac/dc spark anodization of Al-Cu Alloys" *Electrochimica Acta* [60] 102-111 (2012) E. Alsrayheen, B. Campbell, E. McLeod, R. Rateick, V. Birss.

20. "Impact of ac/dc spark anodizing on the corrosion resistance of Al–Cu alloys" *Electrochimica Acta* [56] (17) 6041-6048 (2011), E. Alsayheem, E. McLeod, R. Rateick Jr, H. Molero, V. Birss.
21. "Experimental investigation of lubricant extraction from a micropocket" *Tribology Transactions* [54] (3) 404-416 (2011) C.P. Wang, F. Sadeghi, S.T. Wereley, R.G. Rateick Jr, S. Rowan.
22. "Effect of Solution Properties on the AC/DC Spark Anodizing of Al-Cu alloy AA2219" *ECS Transactions* [25] (40), 57-68 (2010) EA Alsayheem, E.J. McLeod, R.G. Rateick, V.I. Birss.
23. "A statistical damage mechanics model for subsurface initiated spalling in rolling contacts" *Journal of Tribology* [130] (4) 042201 (2008), N. Raje, F. Sadeghi, R.G. Rateick
24. "A numerical model for life scatter in rolling element bearings" *Journal of Tribology* [130] (1) 011011 (2008), N. Raje, F. Sadeghi, R.G. Rateick, M.R. Hoeprich.
25. "Performance characteristics of jet fuel in heavily loaded contacts" *Tribology Transactions*, . [50] (2) 154-164 (2007), T. Hui, F. Sadeghi, R.G. Rateick, Jr., M.C. Frank.
26. "Evaluation of stresses around Inclusions in Hertzian contacts using the discrete element method" *Journal of Tribology* [129] (2) (2007) N.N. Raje, F. Sadeghi, R.G. Rateick, Jr., M.R. Hoeprich.
27. "Solid-particle erosion of an anodized Mg alloy" *Wear* [262] 1056-1060 (2007) K.C. Goretta, A.J. Cunningham, N. Chen, D. Singh, J.L. Routbort, R.G. Rateick, Jr.
28. "A discreet element approach to evaluate stresses due to line loading on a elastic half-space" *Computational Mechanics*, Accepted for publication 2006, Online First, N. Raje, F. Sadeghi, R.G. Rateick.
29. "Solid-particle erosion of tungsten carbide/cobalt cermet and hardened 440C stainless steel—A comparison" *Wear* [261] (7-8) 773-778 (2006) R.G. Rateick, Jr., K.R. Karasek, A.J. Cunningham, K.C. Goretta and J.L. Routbort.
30. "Solid-Particle Erosion of MgO and a Hardened Mg Alloy" in *Mechanical Properties and Performance of Engineering Ceramics II: Ceramic Engineering and Science Proceedings*, Volume 27, K.C. Goretta, D. Singh, A.J. Cunningham, N. Chen, J.L. Routbort,
31. "Impedance characterization of anodic barrier Al oxide film beneath porous oxide layer" *Journal of the Electrochemical Society* [153] (8) B304-B310 (2006) R.K. Potucek, R.G. Rateick, Jr., V.I. Birss.
32. "Relationship of microstructure to fatigue strength loss in anodised aluminium-copper alloys" *Materials Science & Technology* [21] (10) 1227-1235 (2005) R.G. Rateick, Jr., R.J. Griffith, D.A. Hall, K.A. Thompson.
33. "Electrochemical studies of AC/DC anodized Mg alloy in NaCl solution" *Journal of the Electrochemical Society* [151] (3) B179-B187 (2004) S.J. Xia, R. Yue, R.G. Rateick Jr., V.I. Birss.
34. "Characterization of oxide films formed on Mg-based WE43 alloy using AC/DC anodization in silicate solutions" *Journal of the Electrochemical Society* [151] (1) B1-B10 (2004). V. Birss, S. Xia, R. Yue, R.G. Rateick, Jr.
35. "Metastable beta titanium spring performance at elevated temperature" *SAE 2002 Transactions- Journal of Aerospace*, SAE International, Warrendale, Pa., 2003, pp647ff., R.G. Rateick, Jr., K.C. McCool, E.C. Leonard, J.H. Hoeffler.
36. "Anodic oxide film formation at magnesium alloy WE43" [25] 270-280 *Electrochemical Society Proceedings*, S.J. Xia, V.I. Birss, R.G. Rateick, Jr.
37. "Influence of anodization on the fatigue life of WE43A-T6 magnesium" *Scripta Materialia* [40] (8) 929-935 (1999) A.J. Eifert, J.P. Thomas, R.G. Rateick, Jr.
38. "Sealing methods for enhanced corrosion protection of anodized magnesium alloy WE43A-T6" *Magnesium Technology 2002*, TMS, Warrendale, PA, 2002, pp 289-294, R.G. Rateick, Jr., S.J. Xia, V.I. Birss.
39. "Solid particle erosion of hard anodised and uncoated 6061-T651" *Materials Science & Technology* [13] (3) 217-222 (1997) R.G. Rateick, Jr., KR. Karasek, J.L. Routbort, K. Elliot.
40. "Effect of hard anodizing on the fatigue behavior of AA6061-T6 and C355-T6" *Journal of Materials Science Letters* [15] (15) 1321-1323 (1996) R.G. Rateick, Jr., T.C. Binkowski, B. Boray.
41. "Transient and steady-state erosion of in-situ reinforced silicon nitride" *Tribology Transactions* [39] (2) 374-379 (1996) K.R. Karasek, P.J. Whalen, R.G. Rateick, Jr., A.C. Hamilton, J.L. Routbort.
42. "Implementation of commercially available software in the testing, data analysis and databasing phases of tribological research" *Lubrication Engineering* [51] (11) 873-878 (1995) R.G. Rateick, Jr., G.B. Moebs, T.C. Binkowski.
43. "Microstructural effects on the creep of silicon nitride" *Proceedings of the Fifth International Conference on Creep*, May 18-21, 1992, S. Haig, W.R. Cannon, P.J. Whalen, R.G. Rateick, Jr.
44. "The fabrication of rapidly solidified high temperature aluminum alloys" *Advances in Powder Metallurgy* [6] 47-57 (1991) P.S. Gilman, R.G. Rateick, Jr., A. Testa.
45. "Effect of microstructure on the erosion and impact of sintered silicon nitride" *Journal of Materials Science* [26] 5543-5546 (1991) J.E. Ritter, S.R. Choi, K. Jakus, P.J. Whalen, R.G. Rateick, Jr.

**Papers Presented:**

1. "Evolution of Potassium Aluminum Phosphate Anti-Oxidant Coatings during Thermal Oxidation of Carbon-Carbon Composites", High Temperature Corrosion Gordon Conference, July 2017, S. Paulson, V. Kharanagh, K. Xia, L. Tong, R. Rateick, V.I. Birss.
2. "Oxide Film Growth on Al-Cu Alloys during AC/DC Spark Anodization in Alkaline Silicate Solutions" in Electrochemical Society Meeting Abstracts, 1636-1636 (2011) E. Alsrayheen, E. McLeod, H. Molero, R. Rateick, V. Birss.
3. "Effect of Current Density and Time on AC/DC Spark Anodization of Al-Cu Alloys" In Meeting Abstracts, Electrochemical Society Meeting, Vancouver, Canada, April 25-30, 2010, 883 A. Alsrayheen, R. Rateick, V.I. Birss.
4. "Corrosion protection of AA2219 via anodic oxide formation" International Society for Electrochemistry Annual Meeting, September 2006, Edinburgh, UK, E.J. McLeod, R.G. Rateick, Jr., V.I. Birss
5. "Rolling element bearing performance in jet fuel vs. turbine oil" Aeromat 2006, Seattle, WA, May 2006, T.Y. Hui, F. Sadeghi, R.G. Rateick, Jr.
6. "Solid-particle erosion of MgO and a hardened Mg alloy" 30<sup>th</sup> International Conference and Exposition on Advanced Ceramics and Composites, Cocoa Beach, FL, June 2006, D. Singh, K.C. Goretta, A. Cunningham, N. Chen, J.L. Routbort, R.G. Rateick, Jr.
7. "Solid-Particle erosion of tungsten carbide/cobalt cermet vs. hardened AISI 440C Stainless Steel" ICMAT 3'd International conference on Materials for Advanced Technologies, Singapore, July 2005, R.G. Rateick, Jr., K.R. Karasek, A.C. Cunningham, K.C. Goretta, J.L. Routbort.
8. "Anodic oxide film formation at magnesium alloy WE43" Electrochemical Society meeting, Orlando, FL, October 2003, S.J. Xia, V.I. Birss, R.G. Rateick, Jr.
9. "EIS study of anodic oxide films formed by voltammetric methods on Al alloy AA2219" 203d Meeting of the Electrochemical Society, Paris, France, April 2003, R. Potucek, V.I. Birss, R.G. Rateick.
10. "Performance and robustness of fuel-draulic axial-piston pumps and motors" SAE World Aviation Congress, Phoenix, AZ, November 2002, C.S. Evans, A. Kumar, L.A. Portolese, R.G. Rateick, Jr.
11. "Electrochemical response of oxide films formed on Al/Cu alloys" Canadian Society for Chemistry 2002 Conference, Vancouver, B.C., June 2002, R. Potucek, V.I. Birss, R.G. Rateick, Jr.
12. "Cyclic voltammetry as a technique for identifying promising anodizing electrolytes for aluminum beryllium alloys" 51<sup>st</sup> Annual International Society of Electrochemistry Conference, Warsaw, Poland, Sept. 2000, R. Potucek, V.I. Birss, R.G. Rateick, Jr.
13. "Nano-indentation hardness of hard anodized aluminum alloy 6061-T651" Aeromat, Tyson's Corner, VA, June 1998, R. G. Rateick, Jr., L. Riester.
14. "Electrochemical studies of an advanced Mg alloy" Electrochemical Society Meeting, San Antonio, TX, Oct. 1996, R. Yue, R.G. Rateick, Jr., V.I. Birss.
15. "Ceramics for hydraulic pumps" invited paper, NIST/Industry Workshop on Materials Tribology: Wear, Lubrication, and New Materials Issues, NIST, Gaithersburg, MD, April 1994, R.G. Rateick, Jr.
16. "Room-temperature cyclic fatigue in sintered silicon nitride" 95th. Annual Meeting of The American Ceramic Society, April 1993, R.G. Rateick, Jr., D.A. Hall, P.J. Whalen, R.D. Silvers, M.K. Ferber.
17. "On the design and analysis of a novel mechanical ceramic to metal coupling" Third International Ceramic Science and Technology Congress & Exposition, San Francisco, CA, November 1992, D.A. Hall, R.G. Rateick, Jr.
18. "Design implications and phenomenology of corrosion and wear resistance in 8009/SiC/11P (HTDRA)" AeroMat, Anaheim, CA, May 1992, R.G. Rateick, Jr., M.S. Zedalis.
19. "The fabrication of rapidly solidified high temperature aluminum alloys" American Powder Metallurgy Institute/Metal Powder Industry Federation Conference, Chicago, IL, June 1991, R.G. Rateick, Jr., P.S. Gilman, A. Testa.
20. "Machinability of rapidly solidified high temperature aluminum extrusions" WESTEC'90, Los Angeles, CA, March 1990, R.G. Rateick, Jr.
21. "Computer aided chromatography" Old Guard Competition Paper, American Society of Mechanical Engineers Winter Annual Meeting, Anaheim, CA, December 1986, R.G. Rateick, Jr.

**Professional Societies:**

- ASM International: Technical Books Committee (3 years); Notre Dame chapter chair (2 years), program chair, Short course instructor (Ashby methods for material selection); Meeting lecturer (Electrochemical corrosion theory from a historical perspective; Steel manufacturing history 1850-1920).

**Outside Interests:**

- Experimental microbiology, histology, photo microscopy.
- Metallurgical/materials science historian
- Restoration of antique scientific instrumentation and bicycles, amateur machinist
- Designed and built an audio sound restoration studio for preservation of historic recordings