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Center for Biofilm Engineering
Department of Mathematical Sciences
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Education

Ph.D., Mathematics, Montana State University, Bozeman, 2003
M.S., Statistics, Montana State University, Bozeman, 2004
M.S., Mathematics, University of Vermont, 1997
B.S., *Summa Cum Laude*, Mathematics, Computer Science minor, Bridgewater State College, 1994

Professional Experience

2008-present	Biostatistician	Center for Biofilm Engineering, MSU
	Research/Teaching Professor	Department of Mathematical Sciences, MSU
2007-2010	Postdoctoral Fellow	Department of Physics, University of Otago Department of Mathematics (NZIMA), University of Auckland
2004-2005	Postdoctoral Fellow	Center for Adaptive Optics, UC Santa Cruz
1999	Lecturer	Mathematics, University of Vermont
1998	Lecturer	Mathematics, Saint Michael's College, Winooski, VT
1997-2000	Senior Software Engineer	IDX Systems Corporation (now GE), Burlington, VT

Research Interests

Modeling complex biological systems (biofilms, neural systems, vision), iterative sampling from high dimensional densities, Bayesian inverse problems, bifurcation theory with symmetry, clustering

Technical Experience

Numerical computation: Matlab, R, Minitab, SAS
Programming languages: C, MUMPS, Pascal, COBOL

Teaching Experience

Undergraduate Research (information theory, computation, and statistics, M490R)
Numerical Linear Algebra and Optimization (M441)
Introduction to Linear Algebra (M221)
Ordinary Differential Equations (M274)
College Algebra, Precalculus, Calculus I and II (M121, M151, M171, M172)
Applications of Finite Math (voting theory, graph theory, fractals, finance, M149)

Probability Theory and Mathematical Statistics (STAT421, STAT422)
Methods of Data Analysis (STAT411/511)
Statistics for Researchers (STAT401)
Statistics for Scientists and Engineers (STAT332)
Elementary and Intermediate Statistical Concepts (STAT216, STAT217)

College of Letters and Science University Freshman Seminar (CLS101)

Refereed journal articles in mathematical sciences

- Zhang, **Parker**, Carlson, Stewart, Klapper. Multiscale Flux-Balance Based Modeling of Biofilm Communities (submitted to *Multiscale Modeling and Simulation*)
- A. Parker**, B. Pitts, L. Lorenz, P. Stewart. Polynomial accelerated solutions to a LARGE Gaussian model for imaging biofilms: in theory and finite precision. *Journal of the American Statistical Association* (at press, available at <https://www.tandfonline.com/doi/full/10.1080/01621459.2017.1409121>) 2018b.
- C. Fox and **A. Parker**. Accelerated Gibbs sampling of normal distributions using matrix splittings and polynomials. *Bernoulli* 23(4B):3711-3743, 2017.
- C. Fox and **A. Parker**. Convergence in variance of Chebyshev accelerated Gibbs samplers. *SIAM Journal on Scientific Computing*, 36(1):A124-A147, 2014.
- A. Parker**, M. Hamilton, and S. Tomasino. A Statistical Model for Assessing Performance Standards for Quantitative and Semi-quantitative Disinfectant Test Methods. *JAOAC International*, 97(1):58-67, 2014a.
- J. Bardsley, **A. Parker**, A. Solonen, and M. Howard. Krylov Space Methods for Kalman Filtering. *Numerical Linear Algebra with Applications*. 20(2), 171-184, 2013a.
- J. M. Bardsley, A. Solonen, **A. Parker**, H. Haario, and M. Howard. An ensemble Kalman filter using the conjugate gradient sampler. *J. of Uncertainty Quantification*. 3(4), 357-370, 2013b.
- A. Parker** and C. Fox. Sampling Gaussian Distributions in Krylov Spaces with Conjugate Gradients. *SIAM Journal on Scientific Computing*. 34(3), 2012.
- T. Gedeon, **A. Parker**, and A. Dimitrov. The mathematical structure of Information Bottleneck methods. *Entropy: Special issue for the Information Bottleneck Method* 14(3):456-479, 2012.
- A. Parker**, A. Dimitrov and T. Gedeon. Symmetry breaking clusters in soft clustering decoding of neural codes. *IEEE Transactions in Information Theory* Special Issue on Molecular Biology and Neuroscience, 56(2): 901-927. February 2010.
- T. Gedeon, C. Champion, **A. Parker**, and Z. Aldworth. Annealing and the normalized N -cut. *Pattern Recognition*, 41(2):592-606, February 2008.
- C. Vogel, D. Arathorn, A. Roorda, and **A. Parker**. Retinal motion estimation and image dewarping in adaptive optics scanning laser ophthalmoscopy. *Optics Express*, 14: 487-497, January, 2006.
- A. Parker** and T. Gedeon. Bifurcations of a class of S_n -invariant constrained optimization problems. *Journal of Dynamics and Differential Equations*, 16(3):629-678, July, 2004.
- A. Parker**, T. Gedeon, and A. Dimitrov. Annealing and the rate distortion problem. In S. Thrun, S. Becker, and K. Obermayer, editors, *Advances in Neural Information Processing Systems 15*, pages 969-976. MIT Press, 2003.
- T. Gedeon, **A. Parker**, and A. G. Dimitrov. Information distortion and neural coding. *Canadian Applied Mathematics Quarterly*, 10(1):33-70, Spring 2003.

Refereed journal articles in applied sciences

- A. Zelaya, **A. Parker**, K. Bailey, P. Zhang, J. Van Nostrand, N. Daliang, D. Elias, J. Zhou, T. Hazen and M. Fields. High spatiotemporal variability of bacterial diversity over short time scales with unique geohydrochemistry associations within a shallow, pristine aquifer (submitted)
- Martinello, Arbogast, Guercia, **Parker**, Boyce. Nursing Preference for Alcohol-Based Hand Rub Volume (submitted)
- LaBelle, Knapik, Arbogast, Zhou, Bowersock, **Parker**, Voos. Assessing Bacterial Burden in Athletic Training Rooms: A Comparison of High School and Collegiate Facilities (submitted)
- LaBelle, Knapik, Arbogast, Zhou, Bowersock, **Parker**, Voos. Impact of a Quality Improvement Infection Risk Reduction Program on Pathogen Presence in High School and Collegiate Athletic Training Room Facilities (submitted)
- Ozcan, Dieser, **Parker**, Balasubramanian, Foreman. Quorum Sensing Inhibition as a Promising Method to Control Biofilm Growth in Metalworking Fluids *Journal of Industrial Microbiology & Biotechnology* <https://doi.org/10.1007/s10295-019-02181-7>, 2019
- Boyce, Laughman, Ader, Wagner, **Parker**, Arbogast. Impact of an Automated Hand Hygiene Monitoring System and Additional Promotional Activities on Hand Hygiene Performance Rates and Healthcare-Associated Infections (submitted to *Infection Control & Hospital Epidemiology*)
- Kinney, James, Bowersock, **Parker**. Bacterial adhesion and biofilm formation on textured breast implant shell materia. *Aesthetic Plastic Surgery* (to appear)
- Stewart and **Parker**. Measuring Antimicrobial Efficacy against Biofilms: A Meta-Analysis. *Antimicrobial Agents and Chemotherapy*, 2019
- Arbogast, Bowersock, **Parker**, Macinga. Randomized controlled trial evaluating the antimicrobial efficacy of chlorhexidine gluconate (CHG) and para-chloro-meta-xyleneol (PCMX) handwash formulations in real-world doses. *American Journal of Infection Control* 2019
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- J. Arbogast, L. Moore, T. Clark, M. Thompson, P. Wagner, E. Young, **A. Parker**. Who goes in and out of patient rooms? An observational study of room entries and exits in the acute care setting. *American Journal of Infection Control* 2018.
- Shelobolina, Walker, **Parker**, Lust, Schultz, Dickerman. Inactivation of *Pseudomonas aeruginosa* Biofilms Formed under High Shear Stress on Various Hydrophilic and Hydrophobic Surfaces by a Continuous Flow of Ozonated Water. *Biofouling* 2018.
- Parker**, Hamilton, Goeres. Reproducibility of antimicrobial test methods. *Scientific Reports* 8:12531, 2018a.
- Smith, Tigges, Andrilli, Bothner, **Parker**, Foreman. Dynamic processing of DOM: Insight from Exometabolomics, Spectroscopy and Spectrometry. *Limnology and Oceanography Letters* 3: 225-235, 2018.
- Suchomel, Leslie, **Parker**, Macinga. How long is enough? Identification of product dry-time as the primary driver of alcohol-based hand rub efficacy. *Antimicrobial Resistance and Infection Control* 7:65, 2018.

Eggers, Doyle, Lefthand, Young, Nall, Kindness, Other Medicine, Ford, Dietrich, **Parker**, Hoover, Camper. Community Engaged Cumulative Risk Assessment of Exposure to Inorganic Well Water Contaminants in a Native American Community, Montana. *International Journal of Environmental Research and Public Health*, January, 2018.

Davis, Gerlach, Barnhart, **Parker**, Fields. Type and amount of organic amendments affect enhanced biogenic methane production from coal and microbial community structure. *Fuel*, 211:600-608, January 2018.

Xu, Wei, Mettetal, Han, Rau, Tie, May, Pathe, Reddy, Sullivan, **Parker**, Maul, Brennan, Mann. Surface micropattern reduces colonization and medical device-associated infections. *J. Medical Microbiology*, October, 2017.

E. Mann, M. Mettetal, M. Drinker, R. May, B. Stevenson, M. Twite, **A. Parker**, S. Reddy. Micropatterned Endotracheal Tubes Reduce Secretion-Related Lumen Occlusion. *Annals of Biomedical Engineering* 44(12): 3645-3654, 2016.

J. Bingham, G. Abell, L. Kienast, L. Lerner, B. Matuschek, W. Mullins, **A. Parker**, N. Reynolds, D. Salisbury, J. Seidel, E. Young and J Kirk. Healthcare Worker Hand Contamination at Critical Moments in Outpatient Care Settings. *American Journal of Infection Control* 44(11): 1198-1202, 2016.

L. Wahlen, M. Pasmore, D. Walker, **A. Parker**, P. Sturman. Predictive modeling for hot water inactivation of planktonic and biofilm-associated *Sphingomonas parapaucimobilis* to support hot water sanitization programs. *Biofouling* 32(7), 2016.

J. W. Arbogast, L. Moore-Schiltz, W. R. Jarvis, A. Harpster-Hagen, J. Hughes, **A. Parker**. Impact of a Comprehensive Workplace Hand Hygiene Program on Employer Healthcare Insurance Claims plus Costs, Absenteeism, and Employee Perceptions and Practices. *Journal of Occupational and Environmental Medicine* 58(6): e231 - e240, 2016.

J. Moberly, S. D'Imperio, **A. Parker**, B. Peyton. Microbial community signature in Lake Coeur d'Alene: Association of environmental variables and toxic heavy metal phases. *Applied Geochemistry* 66: 174-183, 2015.

Lauchnor, Topp, **Parker**, Gerlach. Whole cell kinetics of ureolysis by *Sporosarcina pasteurii*. *Journal of Applied Microbiology* 118:1321-1332, 2015.

B. Fritz, D. Walker, D. Goveia, **A. Parker**, D. Goeres. Evaluation of Petrifilm Aerobic Count plates as an equivalent alternative to drop plating on R2A agar plates in a biofilm disinfectant efficacy test. *Current Microbiology* 70(3):450-456, March 2015.

Mann, Mettetal, May, Drinker, Stevenson, Baiamonte, Marso, Dannemiller, Parker, Reddy, and Sande. Surface micropattern resists bacterial contamination transferred by healthcare practitioners. *Journal of Microbiology and Experimentation* 1(5), 2014.

- D. Macinga, D. Shumaker, P. Werner, S. Edmonds, R. Leslie, **A. Parker**, and J. Arbogast. The Relative Influences of Product Volume Delivery Format and Alcohol Concentration on Dry-Time and Efficacy of Alcohol-Based Hand Rubs. *BMC Infectious Disease* 14:511, 2014.
- J. Folsom, **A. Parker**, and R. Carlson. Physiological and Proteomic Analysis of Escherichia coli Iron-Limited Chemostat Growth. *Journal of Bacteriology* 196(15): 2748-2761, 2014.
- A. Parker**, D. Walker, D. Goeres, N. Allan, M. Olson, and A. Omar. Ruggedness and Reproducibility of the MBEC biofilm disinfectant efficacy test. *Journal of Microbiological Methods* 102:55-64, 2014b.
- R. May, M. Hoffman, M. Sogo, **A. Parker**, G. O'Toole, A. Brennan, and S. Reddy. Micro-Patterned Surfaces for Reducing in vitro Bacterial Colonization and Biofilm Formation on Endotracheal Tubes. *Clinical and Translational Medicine*, 3:8, 2014.
- N. Mallette, E. Pankratz, **A. Parker**, G. Strobel, S. Busse, R. Carlson, B. Peyton. Evaluation of cellulose as a substrate for hydrocarbon fuel production by *Ascocoryne sarcoides* (NRRL 50072). *Journal of Sustainable Energy Systems*, 4(1), 33-49, 2014.
- S. Tomasino, **A. Parker**, and M. Hamilton. Use of Statistical Modeling to Reassess the Performance Standard for the AOAC Use-dilution Methods (955.15 and 964.02). *JAOAC International*, 97(1): 68-77, 2014.
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- C.R. Allen, O.R. Stein, P.B. Hook, M.D. Burr, **A.E. Parker** and E.C. Hafila. Temperature, Plant Species and Residence Time Effects on Nitrogen Removal in Model Treatment Wetlands. *Water Science and Technology*, 68(11): 2337-2343, 2013.
- M. Hamilton, G. Hamilton, D. Goeres, and **A. Parker**. Guidelines for the Statistical Analysis of a Collaborative Study of a Laboratory Disinfectant Product Performance Test Method. *JAOAC International*, 96(5):1138-1151, 2013.
- R. Pines, S. Tomasino, M. Cottrill, G. Hamilton, and **A. Parker**. Procedural Revision to the Germicidal Spray Products as Disinfectants Test Method: Establishment of Minimum and Maximum Log Density Values for Test Microbes on Inoculated Carriers. *JAOAC International*, 96(3): 567-572, 2013.
- E. L. Sandvik; B. R. McLeod, **A. E. Parker** and P. Stewart. Direct electric current treatment under physiologic saline conditions kills *Staphylococcus epidermidis* biofilms via electrolytic generation of hypochlorous acid. *PLOS ONE*. 8(2), 1-14, 2013.
- J. L. Faulwetter, M. D. Burr, **A. E. Parker**, O. R. Stein, and A. K. Camper. Influence of sulfate reducing bacteria and ammonia oxidizing bacteria on nutrient cycling in constructed wetland microcosms. *Microbial Ecology*. 65(1):111-127, 2013.
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- S. Tomasino, **A. Parker**, M. Hamilton, G. Hamilton. Performance of the AOAC Use-dilution Method with Targeted Modifications: A Collaborative Study. *JAOAC International*. 95(6): 1618-1628, 2012.
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- A. Agostinho, A. Hartman, C. Lipp, **A. Parker**, P. Stewart, G. James. An in vitro model for the growth and analysis of chronic wound MRSA biofilms. *J. Applied Microbiology*, September, 2011.
- S. Behnke, **A. Parker**, D. Woodall, and A. Camper. Comparing the chlorine disinfection of detached biofilm clusters with sessile biofilms and planktonic cells in single and dual species cultures. *Applied and Environmental Microbiology*, 77(20): 7176-7184, 2011.
- A. Corbin, B. Pitts, **A. Parker** and P. Stewart. Antimicrobial Penetration and Efficacy in an In-Vitro Oral Biofilm Model. *Antimicrobial Agents and Chemotherapy*, 55: 3338 - 3344, July 2011.
- D. L. Williams, K. L. Woodbury, **A. E. Parker**, R. D. Bloebaum. A Modified CDC Biofilm Reactor to Produce Mature Biofilms on the Surface of PEEK Membranes for an In Vivo Animal Model Application. *Current Microbiology*, 62(6): 1657-1663, 2011.

J. P. Folsom, L. Richards, B. Pitts, F. Roe, G. D. Ehrlich, **A. Parker**, A. Mazurie, and P. S. Stewart. Physiology of *Pseudomonas aeruginosa* in Biofilms as Revealed by Transcriptional Profiling. *BMC Microbiology*, 10:294, 2010.

A. Roorda, E. Rossi, Y. Zhang, S. Stevenson, D. Arathorn, C. Vogel, A. Parker, Q. Yang. Applications For EyeMotionCorrected Adaptive Optics Scanning Laser Ophthalmoscope Videos. *Investigative Ophthalmology & Visual Science*, Vol.47, 1808. May 2006.

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- A. Dimitrov, T. Gedeon, B. Mumey, R. Snider, Z. Aldworth, **A. E. Parker**, and J. P. Miller. Derivation of natural stimulus feature set using a data-driven model. Chapter in P. M. A. Sloot, D. Abramson, A. V. Bogdanov, J. Dongarra, A. Y. Zomaya, and Y. E. Gorbachev, editors, International Conference on Computational Science, *Lecture Notes in Computer Science*, 2660:337-345, Springer, August 2003.
- A. Dimitrov, J. Miller, Z. Aldworth, T. Gedeon, and **A. Parker**. Analysis of neural coding through quantization with an information-based distortion measure. *Network: Computation in Neural Systems*, 14:151-176, February, 2003.
- A. Dimitrov, J. Miller, Z. Aldworth, and **A. Parker**. Spike pattern-based coding schemes in the cricket cercal sensory system. *Neurocomputing*, pages 44–46, 373-379, 2002.

Refereed Proceedings

- Imaging Demonstrates Biofilm Volume Reductions After Treatment With Oral Rinses. Rieidi, Rusin, Yang, James, Parker. 97th General Session of the International Association of Dental Research, Vancouver, June 19, 2019 (accepted).
- Arbogast J, Quinn J, Clark T, Moore L, Thompson M, Wagner P, Young B, **Parker A**. Who goes in and out of the hospital patient room? *American Journal of Infection Control*, 45(6): S29. 2017-036, June, 2017.
- Leslie, Donskey, Zabarsky, **Parker**, Macinga, Assadian. Measuring Alcohol-Based Hand Rub Volume Used By Healthcare Workers In Practice. *Antimicrobial Resistance & Infection Control Journal*, 4(Suppl 1): P295, ICPIC 2015

- M. Ryder, G. James, E. deLancey Pulcini, **A. Parker**. An in vitro comparison of intraluminal biofilm bacteria transfer of three peripheral intravenous valved blood control catheters. *American Journal of Infection Control*, 41(6):S127-S128, 2013.
- C.R. Allen, O.R. Stein, P.B. Hook, M.D. Burr, **A.E. Parker** and E.C. Hafila. Temperature, Plant Species and Residence Time Effects on Nitrogen Removal in Model Treatment Wetlands. *Proc. 13th Inter. Conf. on Wetland Systems for Water Pollution Control*. Perth, Australia, November 25-29, 2012.
- Symmetry breaking in soft clustering decoding of neural codes A. G. Dimitrov, A. Parker and T. Gedeon. *BMC Neuroscience*, 10(Suppl 1):P120, July 13, 2009.
- C. Vogel, D. Arathorn, **A. Parker**, and A. Roorda. Retinal motion tracking in adaptive optics scanning laser ophthalmoscopy. *Proceedings of OSA Conference on Signal Recovery and Synthesis*, JTUC2, Charlotte NC, June 2005.

Non-refereed publications

- M. Hamilton and **A. Parker**. Disinfectant Test Results: How to Average Across Laboratories. Center for Biofilm Engineering, KSA-SM-15. March 21, 2015.
- M. Hamilton and **A. Parker**. Using R to calculate confidence intervals for the repeatability and reproducibility standard deviations and the intra-laboratory correlation coefficient of a disinfectant test method. Center for Biofilm Engineering, KSA-SM-14. November 7, 2013.
- A. E. Parker**. Interlaboratory Study to Establish Precision Statements for ASTM E2871-13: Standard Test Method for Evaluating Disinfectant Efficacy against *Pseudomonas aeruginosa* Biofilm Grown in CDC Biofilm Reactor using the Single Tube Method. ASTM International, research report RR:E35-1008, October, 2013.
- A. Parker** and M. Hamilton. Using R to assess resemblance, repeatability, and reproducibility for quantitative and semi-quantitative disinfectant methods,. Center for Biofilm Engineering, KSA-SM-13. August 7, 2013.
- A. E. Parker**. Interlaboratory study for ASTM method E2799-11 Standard Test Method for Testing Disinfectant Efficacy against *Pseudomonas aeruginosa* Biofilm using the MBEC Assay. ASTM International, research report RR:E35-1006, 2011.
- A. E. Parker** and M. A. Hamilton. Resemblance, Repeatability, and Reproducibility for quantitative methods. Center for Biofilm Engineering, KSA-SM-10, 2011.
- M. A. Hamilton and **A. E. Parker**. Enumerating viable cells by pooling counts for several dilutions. Center for Biofilm Engineering, KSA-SM-06. October 2010.
- S. Kubiak, H. Lehr, R. Levy, T. Moeller, **A. Parker**, and E. Swim. Modeling control of HIV infection through structured treatment interruptions with recommendations for experimental protocol. Report 5 in Pierre A. Gremaud, Zhilin Li, Ralph C. Smith, and Hien T. Tran, editors, Center for Research in Scientific Computation at North Carolina State University Technical Report, CRSC-TR01-27, November, 2001.

Selected Presentations

- How to accelerate Bayesian experimental design assessments for LARGE problems*, Uncertainty Quantification Conference hosted by Center of Mathematical Investigations and University of Bath, (BUC13-GUQ2018), Guanajuato Mexico, May 29, 2018
- Fast Experimental Designs for LARGE Linear Processes*, Conference on Uncertainty Quantification, Society for Industrial and Applied Mathematics (SIAM) and American Statistical Association (ASA), Garden Grove, CA, April 19, 2018
- Seasonal analysis of hand hygiene impact on preventable illnesses in the workplace*. Arbogast, **Parker**, Aurora, Jarvis. APHA Annual Meeting and Expo Creating the Healthiest Nation: Climate Changes Health, Atlanta, November 7, 2017
- Quantifying biofilm characteristics over time from 3-D confocal microscope movies*. Workshop at American Society for Microbiology Biofilm Conference, Chicago, October 24, 2015.
- Method validation: a case study of the single tube biofilm method*. Conference on Recent Advances in Microbial Control, Society for Industrial Microbiology and Biotechnology, San Francisco, November 12, 2014.
- Comparison of Bacterial Transfer and Biofilm Formation on Intraluminal Catheter Surfaces Among Fourteen Connectors in a Clinically Simulated in vitro Model*. Ryder M, Pulcini E, Parker A, James G. Poster at World Congress of Vascular Access, Berlin Germany, June 18-20, 2014.
- Using Polynomials to Sample from Large Gaussians Used to Model 3-D Confocal Microscope Images of Biofilms*. Society for Industrial and Applied Mathematics (SIAM) Conference on Uncertainty Quantification, Savannah, GA, April 2, 2014
- Using polynomials and matrix splittings to sample from LARGE Gaussians*. An invited talk at MIT, Cambridge, MA, June 4, 2013.
- Some implementation issues with Gaussian iterative samplers in finite precision*. Southern Uncertainty Quantification conference. Dunedin, New Zealand, Jan 7, 2013.
- The effect of a titanium bonded PICC on the reduction of extraluminal catheter surface fibrin deposition and venous thrombosis in an in vivo clinically simulated ovine model (pilot study)*. Ryder M, Gunther R, Griffey S, Breznock G, Parker A. Association for Vascular Access, San Antonio, October 2012.
- Statistical methods for analyzing research data*. American Society for Microbiology Biofilm Conference Workshop, Miami, September 29, 2012.
- In vitro comparison of biofilm formation in blood control (BC) and non BC-PIV catheters*. Marcia Ryder, Elinor deLancey Pulcini, Albert Parker, Steve Fisher, Laura Bickle, and Garth James. Infusion Nurses Society Annual Convention and Industrial Exhibition. Las Vegas, NV. April 30-May 3, 2012.
- Statistical Assessment and Standardization of the MBEC Assay for Testing Disinfectant Efficacy against Pseudomonas aeruginosa biofilm*. Workshop on biofilm formation on medical devices attended by FDA, NIST and industry. Silver Spring, Maryland. April 12, 2012.
- Differences in Bacterial Transfer and Fluid Path Colonization through Needle-free Connector-Catheter Systems In Vitro*. Ryder, M., James, G., Pulcini, E. Bickle, L., Pesch, M., Parker, A.

The Society for Healthcare and Epidemiology of America, Poster Session at the Annual Scientific Meeting. Dallas. April 1-4, 2011.

Ruggedness Assessment and Experimental Design in the Biofilm Laboratory. 5th American Society for Microbiology Conference on Biofilms. Standardized Biofilm Methods Workshop. Cancun, Mexico. November 15, 2009.

Retinal motion tracking in adaptive optics scanning laser ophthalmoscopy. Optical Society of America Conference 2005: Signal Recovering in Adaptive Optics. Charlotte, NC, June, 2005.

Dewarping Images from a Scanning Laser Ophthalmoscope. Center for Adaptive Optics, SLO image processing meeting. University of California, Berkeley, April 19, 2005.

Phase Transitions in the Information Distortion. Neural Information Processing Systems, Workshop on Information Theory and Learning: The Bottleneck and Distortion Approach. Whistler, BC, Canada, December 13, 2003.

A Bifurcation Theoretical Approach to Solving the Neural Coding Problem. Integrated Graduate Education and Research Traineeship Symposium. Carnegie Mellon University, Pittsburgh, PA, June 28, 2003.

Modeling Control of HIV Infection through Structured Treatment Interruptions. S. Kubiak, H. Lehr, R. Levy, T. Moeller, A. Parker, and E. Swim. Industrial Mathematical Modeling Workshop. North Carolina State University, Raleigh, NC, August, 2001.

Grants

Antimicrobial Test Method Statistical Support & Consultation Goeres, D. (PI), Parker, A. (co-PI), US EPA, April 2017 - April 2020, \$105,000

Collaborative Research: Connecting Omics to Physical Environment in Community Microbial Ecology Zhang, T. (PI), Klapper, I. (PI), Parker, A. (co-PI), Stewart, P. (co-PI), National Science Foundation #1516951, September 1, 2015 - August 31, 2018, \$317,904.

Development and Use of Standard Methods for the Growth, Treatment, Sampling and Analysis of Biofilm Bacteria Goeres, D. (PI), Parker, A. (co-PI) US EPA EP-14-H-000233, January 21, 2014 - January 20, 2017, Current Funding: \$110,000.00.

Awards

US EPA Level 1 Scientific and Technology Achievement Award 2015, with collaborators S. Tomasino, M. Hamilton and G. Hamilton for research papers that changed the way that EPA regulates liquid antimicrobials in the US.

Outstanding Faculty Award, Center for Biofilm Engineering, Bozeman, 2013

Honors bestowed by MSU's math club: *Most Lively Lectures* 2014; *Easiest going Dad* 2013; *The Dr. Phil Award* 2012; *Best Diagrams* 2011

Influential Educator, MSU, 2007

Nominated for MSU's *President's Excellence in Teaching Award* in 2006

Graduate Teaching Assistant, Department of Mathematical Sciences, MSU, 2002-2003

Graduate stipend from the *Integrated Graduate Education and Research Trainee-ship* (IGERT) Program, National Science Foundation, funded research assistantship in the Center for Computational Biology, MSU, 1999-2002

Presidential Graduate Scholarship, MSU, 1999-2000

Graduate Teaching Fellowship, University of Vermont, 1995-1997

Elected to *Pi Mu Epsilon*, National Honorary Mathematics Society, 1994

B.S. in Mathematics awarded *Summa Cum Laude* by Bridgewater State College, 1994

Professional Activities

PhD and Masters Committees:

Steve Walsh. MSU, PhD in statistics, 2023.

Lisa Bowersock. MSU, MS in statistics, 2020.

Mario Santana Cibrian, *High level solution representation and MCMC design in the Bayesian analysis of two inverse problems*, Centro de Investigacion en Matematicas, Guanajuato, Mexico, PhD in Statistics, 2016.

Ben Jackson, *The Inverse Biofilm Problem*, MSU, PhD in Math, 2015.

Marylesa Howard, *Computational Methods for Support Vector Machine Classification and Large-Scale Kalman Filtering*, University of Montana, PhD in Math, 2013.

Elizabeth Mosher, MSU. MS in Math, 2014.

James Moberly, *Microbial Communities: the effect of environmental variables and operationally defined toxic heavy metal phases*, MSU, PhD in Chemical and Biological Engineering, 2010.

Markus Diesler, *Ecosystem Dynamics And Temporal Variations In A Microbially Dominated, Coastal Antarctic Lake*, MSU, PhD in Ecology and Environmental Sciences, 2009.

Rachael Welder, *Preservice Elementary Teachers' Mathematical Content Knowledge of Prerequisite Algebra Concepts*, MSU, PhD in Math Education, 2007.

Co-organizer (with John Bardsley at University of Montana), Inverse Problems and Biofilms session at the Pacific Northwest Meeting of the Mathematical Association of America, Missoula, MT, June 26-27, 2014.

Reviewer for:

JAOAC, Journal of the Association of Official Analytic Chemists

AMB Express, journal in the area of applied and industrial microbiology

Biofouling, journal of bioadhesion and biofilm research

BMC Microbiology

European Journal of Applied Mathematics

entropy, a journal of information studies

Foundational and Applied Statistics for Biologists Using R, Ken Aho, CRC Press

IET Systems Biology

Mathematical Reviews, American Mathematical Society

PLOS ONE

Journal of Scientific Computing (SISC), Society for Industrial and Applied Mathematics

Administrative Committees, Department of Mathematical Sciences, MSU:

Search committee for accountant, 2015.

Non-tenure track faculty promotion and retention committee, 2012-2013.

Executive committee, non-tenure track faculty representative, 2008-2009.

Graduate program committee, graduate student representative, 2001-2003.

Business intelligence, eBags, 2010-2012.

Department of Education, MSU

Project Evaluator, National Science Foundation Mathematics and Science Partnership: Gallatin to Glacier Middle Grades Mathematics Project, a collaboration between Bozeman, Browning and Gallatin County School Districts, 2006-2007.

Curriculum advisor, *Brain Science, Educational Research, and Teaching*, a graduate course in the Northern Plains Transition-to-Teaching Program, 2004.

Estimating Biomass Using Synthetic Aperture Radar (SAR) Measurements, Yellowstone Ecological Research Center, 2005-2006.

Undergraduate Research Assistant for Professor Dennis Healy, Department of Mathematics, Dartmouth College, 1994 – 1995.

Community Activities

Organizer, Climbing Club at Irving Elementary School, Bozeman, 2015-2018.

Instructor, Bozeman Okinawan Karate, 2010-2013, 2018-2019.

Volunteer, MSU Move-In Day, 2017

Gallatin County Election Judge, 2006, 2016, 2017.

Panelist, Career panel for math and statistics majors, Bridgewater State University, Feb 18, 2014.

MSU Faculty Advisor: Wilderness Club 2011-2018; Rhapsody A Capella 2015; Lacrosse Club 2012-2015; Folklore Club, 2012-2013.

Host, Office of International Programs, MSU: Bozeman Friends of International Students, 2009-2010, 2012-2013; Teaching Excellence and Achievement Program 2014

Volunteer,

Robot scrimmage for FIRST (For Inspiration and Recognition of Science and Technology) at the University of Vermont, Feb. 15, 2014 (<http://www.uvm.edu/first/>).

Montana Wilderness Association, 2009-2019.

Gallatin Valley Bike Club, 2009-2014.

Gallatin Valley Land Trust, 2010-2014.

Into the Streets, MSU Volunteer Fair, 2008-2010, 2012-2013.

Gallatin County Search and Rescue, 2008-2009.

Debate Judge, Original Oratory at the Montana District National Forensic Tournament, February 11-12, 2011; Policy Debate, Jan 14-17, 2009.

Mentor, Student-Athlete Mentoring Program, Department of Athletics, MSU, 2004-2006.

Your Brain, Crickets, and Math. An invited talk for 4th and 5th graders at Longfellow Elementary School, Bozeman, MT, May, 2004.

Gottfried Leibniz, Carl Gauss and Neural Coding. An invited talk for German students at Bozeman High School, Bozeman, MT, May 9, 2002.

Event Judge, Montana Science Olympiad for middle schoolers, Bozeman Public Schools, 2000–2002.

Shadowee, Job Shadow Program, Turner Youth Development Initiative in cooperation with Bozeman Public Schools, March, 2001.