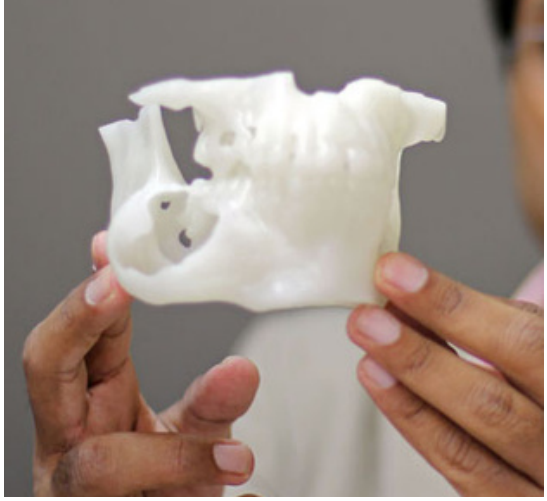
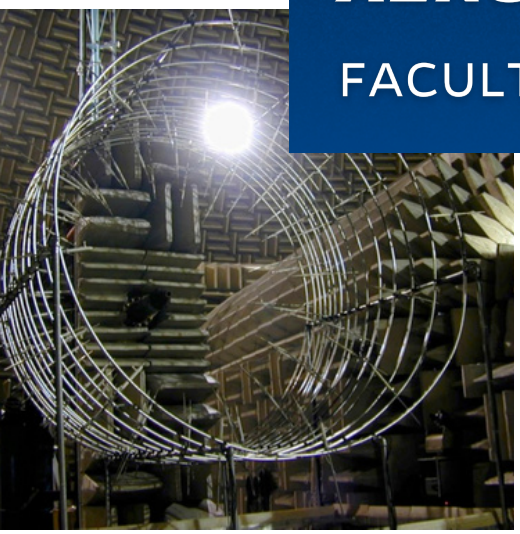
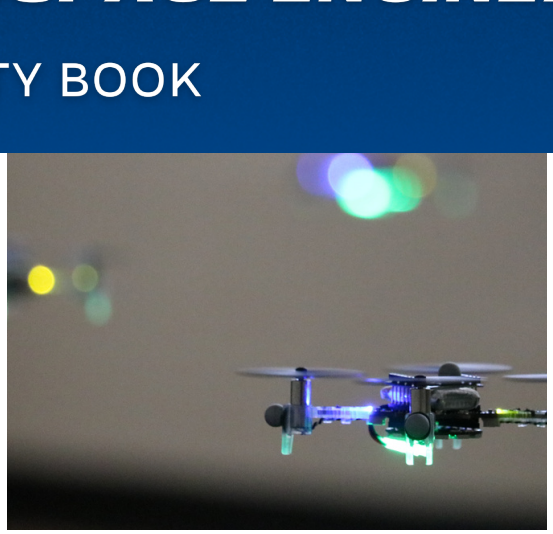
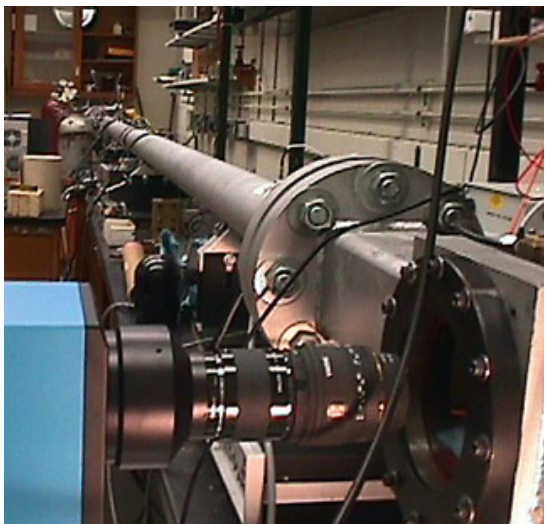





MECHANICAL AND AEROSPACE ENGINEERING

FACULTY BOOK


UF UNIVERSITY of FLORIDA

2022

JOHN ABBITT

INSTRUCTIONAL ASSOCIATE PROFESSOR

KEYWORDS

OVERVIEW

SELECTED PUBLICATIONS

- Carroll, B. F., Abbitt, J. D., Lukas, E. W., & Morris, M. J. (1996). Step response of pressure-sensitive paints. AIAA Journal, 34(3), 521–526. https://doi.org/10.2514/3.13099
- Abbitt, J. D., Segal, C., McDaniel, J. C., Krauss, R. H., & Whitehurst, R. B. (1993). Experimental supersonic hydrogen combustion employing staged injection behind a rearward-facing step. Journal of Propulsion and Power, 9(3), 472–478. https://doi.org/10.2514/3.23646
- Roy J. Hartfield, John D. Abbitt, and James C. McDaniel, "Injectant mole-fraction imaging in compressible mixing flows using planar laser-induced iodine fluorescence," Opt. Lett. 14, 850-852 (1989)
- Abbitt, J. D., Hartfield, R. J., & McDaniel, J. C. (1991). Mole-fraction imaging of transverse injection in a ducted supersonicflow. AIAA Journal, 29(3), 431–435. https://doi.org/10.2514/3.10596
- Carroll, B. F., Winslow, A., Abbitt, J., Schanze, K., & Morris, M. (n.d.). Pressure sensitive paint: Application to a sinusoidal pressure fluctuation. ICIASF '95 Record. International Congress on Instrumentation in Aerospace Simulation Facilities. https://doi.org/10.1109/iciasf.1995.519466
- Abbitt, J. D., & Carroll, B. F. (1993). Applied aerodynamics experience for secondary science teachers and students. Journal of Engineering Education, 82(3), 185–188. https://doi.org/10.1002/j.2168-9830.1993.tb00100.x

EDUCATION

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University of Virginia

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KATERINA E. AIFANTIS

ASSOCIATE PROFESSOR

KEYWORDS

OVERVIEW

Professor Aifantis was trained in understanding materials behavior at the submicron scales, and part of her work until today focuses on understanding deformation of nanomaterials, such as for graphene. The majority of her time, however, is spent on her pioneering work of using multiphysics models for developing design criteria for next generation battery electrodes, which she then fabricates and tests in lithium-ion and sodium-ion batteries. She has used similar techniques for synthesizing materials that allow for enhanced tissue regeneration. She co-authored and co-edited two books on batteries with Wiley-VCH, and has published over 90 peer reviewed articles.

SELECTED PUBLICATIONS

- Ahuja U., Wang B., Hu P., Réthoré J., Aifantis K.E., Polydopamine coated Si nanoparticles allow for improved mechanical and electrochemical stability, Electrochimica Acta 392, 138993, 2021
- Shuang F, Aifantis K.E., A first molecular dynamics study for modeling the microstructure and mechanical behavior of Si nanopillars during lithiation, ACS Applied Materials & Interfaces 13, 21310-21319, 2021.
- Shuang F.G , Aifantis,K.E, Dislocation-graphene interactions in Cu/graphene composites and the effect of boundary conditions: a molecular dynamics study, Carbon 172, 50-70, 2021.
- Hu P.P, Peng W.P, Wang B.G, Xiao D.P, Ahuja U.G, Réthoré R., Aifantis K.E., Concentration-Gradient Prussian Blue Cathodes for Na-Ion Batteries, ACS Energy Letters 5, 100-108, 2020.
- Shuang F.G, Deng H.A, Shafique A. B.G, Marsh S., Treiman D., Tsakalis K., Aifantis K. E. A first study on nanoporous tungsten recording electrodes for deep brain stimulation. Materials Letters, article #126885 (4 pg), 2019.
- Huang Y.G, Deng H.A, Fan Y., Zheng L., Che J.G, Li X., Aifantis K.E., Conductive nanostructured Si biomaterials enhance osteogeneration through electrical stimulation, Matls Sci. & Eng. C 103, article# 109748 (10 pg), 2019.

KEY AWARDS

- 2019 Recipient of Foteinou Award from the Academy of Athens
- 2019 Recipient of Stoddard International Scientific Award
- Plenary Speaker at SIPS2017 along with Nobel Laureates Shechtman & Murad
- 2011 Michigan Tech Young Alumni Award
- 2008 Youngest Recipient, at age 24, of 1.1 Million Euro from EU Research Council
- 2005 Youngest PhD ever in The Netherlands at age of 21

EDUCATION

Ph.D. 2005
University of Groningen

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JESSICA ALLEN

ASSISTANT PROFESSOR

KEYWORDS

Biomechanics, Musculoskeletal Modeling, Machine Learning/Artificial Intelligence, Predictive Simulation

OVERVIEW

Professor Allen's research focuses on identifying biomechanical targets that can guide interventional decisions in rehabilitation and device design for individuals with ambulatory impairments. This work leverages musculoskeletal modeling and machine learning techniques to identify deficits in lower-extremity biomechanics and to predict how different interventions or devices will improve ambulatory function.

SELECTED PUBLICATIONS

- H.D. Carey, D.J. Liss, and J.L. Allen, "Young adults recruit similar motor modules across walking, turning, and chair transfers," Physiological Reports, Vol. 9, No. 18, pp. e1505 (2021).
- J.L. Allen, T.M. Kesar, and L.H. Ting, "Motor module generalization across balance and walking is impaired after stroke," Journal of Neurophysiology, Vol. 122, No. 1, pp. 277-289 (2019).
- J.L. Allen and J.R. Franz, "The motor repertoire of older adult falls may constrain their response to balance perturbations" Journal of Neurophysiology, Vol. 120, No. 5, pp. 2639-2378 (2018).
- J.L. Allen and L.H. Ting, "Why is neuromechanical modeling of balance and locomotion so hard," Neuromechanical modeling of posture and locomotion, Springer, New York, NY, pp. 197-223 (2016).
- J.L. Allen and R.R. Neptune, "Three-dimensional modular control of human walking," Journal of Biomechanics, Vol. 45, No. 12, pp. 2157-2163 (2012).

KEY AWARDS

- 2020 American Society of Biomechanics Research Travel Award
- 2018 Opensim Travel Award from the National Center for Simulation Rehabilitation Research
- National Institutes of Health F32 Individual Post-doctoral Fellowship (2015-2017)
- National Science Foundation Graduate Research Fellowship (2007-2012)

EDUCATION

Ph.D. 2012
University of Texas at Austin

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THOMAS E. ANGELINI

ASSOCIATE PROFESSOR

KEYWORDS

Collective cell motion, mechanical instabilities in tissue cell assemblies, bacterial biofilm physics, soft matter physics, biomolecular self-assembly, and tribology of soft matter interfaces

OVERVIEW

Professor Angelini's research interests include collective cell motion, mechanical instabilities in tissue cell assemblies, bacterial biofilm physics, soft matter physics, biomolecular self-assembly, and tribology of soft matter interfaces.

SELECTED PUBLICATIONS

- "Writing in the Granular Gel Medium" T. Bhattacharjee, S.M. Zehnder,K.G. Rowe, S. Jain, R.M. Nixon, W.G. Sawyer, T.E. Angelini; Science Advances, e1500655, 1-6 (2015).
- "Cell Volume Fluctuations in MDCK Monolayers" S.M. Zehnder, M. Suaris,M.M. Bellaire, T.E. Angelini; Biophys. J., 108, 247-250 (2015)
- "Self-Assembled Micro-Organogels for 3D Printing Silicone Structures" C.S. O'Bryan, T. Bhattacharjee, S. Hart, C.P. Kabb, K.D. Schulze, I. Chilakala, B.S. Sumerlin, W.G. Sawyer, T.E. Angelini; Science Advances, 3, e1602800 (2017).
- "3D Printing with Sacrificial Materials for Soft Matter Manufacturing" C.S. O'Bryan, T Bhattacharjee, S.R. Niemi, S. Balachandar, N. Baldwin, S.T. Ellison, C.R. Taylor, W.G. Sawyer, T.E. Angelini; MRS Bulletin, 42 571-577 (2017)
- "Quantitative Characterization of 3D Bioprinted Structural Elements Under Cell Generated Forces" C. Morley, S.T Ellison, T. Bhattacharjee, C.S. O'Bryan, Y. Zhang, K. Smith, C.P. Kabb, M. Sebastian, G. Moore, K.D. Schulze, S.R. Niemi, W.G. Sawyer, D. Tran, D. Mitchell, B.S. Sumerlin, C. Flores, T.E. Angelini; Nature Communications, 10 3029 (2019)
- "3D printed collagen structures at low concentrations supported by jammed microgels" Y. Zhang, S.T. Ellison, S. Duraivel, C.D. Morley, C.R. Taylor, T.E. Angelini; Bioprinting, 21 e00121 (2021)
- "Spatiotemporal T cell dynamics in a 3D bioprinted immunotherapy model" C.D. Morley, C.T. Flores, J.A. Drake, G.L. Moore, D.A. Mitchell, T.E. Angelini; Bioprinting, e00231 (2022)

KEY AWARDS

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University of Illinois

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NAGARAJ ARAKERE

PROFESSOR

KEYWORDS

Fatigue of materials, Rolling contact fatigue, Constitutive and finite element model development for damage mechanics

OVERVIEW

Prof. Arakere's research interests include Damage mechanics of structural materials subjected to monotonic and fatigue loading, Fatigue life evaluation, Rolling contact fatigue, Spall propagation, Superalloys, Foams, Related constitutive and finite element model development, and Dynamics of rotor-bearing systems.

SELECTED PUBLICATIONS

- N. Londhe, N. Arakere, G. Subhash, 2019, "Effect of Plasticity on the Dynamic Capacity of Modern Bearing Steels," Tribology International, Vol. 133, pp. 160-171.
- N. Londhe, N. Arakere, R. Haftka, 2015, "Reevaluation of Rolling Element Bearing Load-Life Equation based on Fatigue Endurance Data," Tribology Transactions, 58, pp. 815-828, DOI: 10.1080/10402004.2015.1021943.
- N. Arakere, 2016, "Gigacycle Rolling Contact Fatigue of Bearing Steels: A Review," International Journal of Fatigue, Vol. 93, pp. 238-249.
- A. Pandkar, N. Arakere, G. Subhash, 2015, "Ratcheting-Based Microstructure-Sensitive Modeling of Cyclic Hardening Response of Case-Hardened Bearing Steels Subject to Rolling Contact Fatigue," International Journal of Fatigue, 73, pp. 119-131.
- P.A. Sabnis, M. Mazière, S. Forest, Nagaraj K. Arakere, F. Ebrahimi, 2012, "Effect of secondary orientation on notch-tip plasticity in superalloy single crystals," The International Journal of Plasticity., 28, pp. 102-123.
- Arakere, N. K and Swanson, G., 2002, "Effect of Crystal Orientation on Fatigue Failure of Single Crystal Nickel Base Turbine Blade Superalloys," ASME Journal of Gas Turbines and Power, Vol. 124, pp. 161-176.

KEY AWARDS

- 1.2021: Interview with Tribology Transaction/TLT magazine (http://digitaleditions.walsworth.com/publication/?i=721007&ver=html5&p=24)
- Walter D. Hodson Best Paper Award (2017)-STLE
- Orr JEMT Best Paper Award (2016) - ASME
- 2000 ASME/IGTI Best Paper Award (Effect of Crystal Orientation on Fatigue Failure of Single Crystal Nickel Base Turbine Blade Superalloys)
- 2004 ASME/IGTI Best Paper Award (Investigation of 3D Stress Fields and Slip Systems in Single Crystal Superalloy Notched Specimens)

ASME FELLOW

EDUCATION

Ph.D. 1988
Arizona State University

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S. "BALA" BALACHANDAR

NEWTON C. EBAUGH PROFESSOR,
DISTINGUISHED PROFESSOR

KEYWORDS

Computational fluid science (aka CFD), large-scale simulations of complex flows, transition and turbulence, multiphase flows

OVERVIEW

Prof. Balachandar's research focuses on solving complex fluid mechanical phenomena of societal importance using very large-scale computational simulations that serve as digital twins or surrogate experiments. His expertise in bringing theoretical modeling, peta/exa-scale simulations, and machine learning to address multiphase flow problems that arise in nature as well as man-made systems.

SELECTED PUBLICATIONS

- Balachandar, S., & Michaelides, E. E. Dispersed Multiphase Heat and Mass Transfer. Annual Review of Heat Transfer, 24 (2022).
- Liu, K., Allahyari, M., Salinas, J. S., Zgheib, N., & Balachandar, S. Peering inside a cough or sneeze to explain enhanced airborne transmission under dry weather. Scientific Reports, 11(1), 1-9 (2021).
- Salinas, J. S., Balachandar, S., Shringarpure, M., Fedele, J., Hoyal, D., Zuñiga, S., & Cantero, M. I. Anatomy of subcritical submarine flows with a lutocline and an intermediate destruction layer. Nature communications, 12(1), 1-11. (2021).
- Salinas, J., Balachandar, S., Shringarpure, M., Fedele, J., Hoyal, D., & Cantero, M. Soft transition between subcritical and supercritical currents through intermittent cascading interfacial instabilities. Proceedings of the National Academy of Sciences, 117(31), 18278-18284 (2020).
- Balachandar, S. and Eaton, J.K. Turbulent dispersed multiphase flow. Annual Review of Fluid Mechanics 42, 111-133 (2010).

KEY AWARDS

- Thermal Fluids Engineering Award, American Society of Thermal Fluids Engineer, May 2022
- Doctoral Dissertation Advisor/Mentoring Award, University of Florida, April 2020
- Outstanding Alumnus Award, Indian Institute of Technology, Madras, March 2020
- Gad Hetsroni Senior Researcher Award, International Conference on Multiphase Flow, Rio De Janeiro, Brazil, May 2019
- Freeman Scholar Award, American Society of Mechanical Engineers, July, 2017
- Distinguished Professor, University of Florida, Gainesville, FL, 2016
- Fellow, American Society of Mechanical Engineers, 2008
- Fellow, American Physical Society, 2006

EDUCATION

Ph.D. 1988
Brown University

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SCOTT A. BANKS

PROFESSOR

KEYWORDS

Biomechanics, Robotics, Imaging, Orthopaedics, Machine Learning

OVERVIEW

Professor Banks' research, conducted in the Gary J. Miller, PhD, Orthopaedic Biomechanics Laboratory is focused on helping orthopaedic surgeons to get better results for their patients. Projects span a wide range of medical applications and include design of joint replacement implants and surgical instruments, human movement analysis, robotic imaging and surgical systems, and AI methods for clinical diagnostics of joint mechanics.

SELECTED PUBLICATIONS

- Accurate measurement of three-dimensional knee replacement kinematics using single-plane fluoroscopy. Banks, SA; Hodge, WA. IEEE TRANSACTIONS ON BIOMEDICAL ENGINEERING, 43(6):638-649,1996
- An Extended Kalman Filter for Real-Time Estimation and Control of a Rigid-Link Flexible-Joint Manipulator. Lightcap, CA; Banks, SA. IEEE TRANSACTIONS ON CONTROL SYSTEMS TECHNOLOGY, 18(1):91-103, 2010
- Grand challenge competition to predict in vivo knee loads. Fregly, BJ; Besier, TF; Lloyd, DG; Delp, SL; Banks, SA; Pandy, MG; D'Lima, DD. JOURNAL OF ORTHOPAEDIC RESEARCH, 30(4): 503-513, 2012
- Accuracy of Dynamic Tactile-Guided Unicompartmental Knee Arthroplasty. Dunbar, NJ; Roche, MW; Park, BH; Branch, SH; Conditt, MA; Banks, SA. JOURNAL OF ARTHROPLASTY, 27(5):803-808, 2012
- In-vivo three-dimensional knee kinematics during daily activities in dogs. Kim, SE; Jones, SC; Lewis, DD; Banks, SA; Conrad, BP; Tremolada, G; Abbasi, AZ; Coggeshall, JD; Pozzi, A. JOURNAL OF ORTHOPAEDIC RESEARCH, 33(11):1603-1610, 2015

KEY AWARDS

- 2019 Dick Aubin Distinguished Paper Award, Soc. Manufact. Eng.,
- 2018 Jacques Jenny Memorial Lecturer, Veterinary Orthopaedic Society
- 2015 UF College of Engineering E4 Lecturer,
- 2013 Elected member of The Knee Society
- 2012 Teacher of the Year, Department of Mechanical & Aerospace Engineering,
- 2011 Teacher of the Year, College of Engineering
- 2010 Pramod P. Khargonekar Outstanding Faculty Award
- 2003 Hap Paul Award, International Society for Technology in Arthroplasty

ELECTED INTO THE KNEE SOCIETY, 2013

EDUCATION

Ph.D. 1992 MIT

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https://publons.com/researcher/1610799/scott-arthur-banks/

PRABIR BAROOAH

PROFESSOR

KEYWORDS

Control, Optimization, AI, Energy Efficiency, Renewable Energy

OVERVIEW

Professor Barooah's research is focused on autonomous and data-driven control of complex systems that are relevant to energy, sustainability and resiliency. Specific applications include control of heating, ventilation, and air conditioning (HVAC) systems to reduce energy use and carbon emissions, coordination of consumer loads to vary their demand so that they can help mitigate volatility of solar and wind energy, and machine-learning based methods to both learn models from data and derive optimal control laws without models.

SELECTED PUBLICATIONS

- "With rooftop solar, it is not just about the carbon reduction", Prabir Barooah, The Hill, Oct 8, 2021. https://thehill.com/opinion/energy-environment/575937-with-rooftop-solar-its-not-just-about-the-carbon-reduction
- "Simultaneous identification of linear building dynamic model and disturbance using sparsity-promoting optimization", T Zeng, J Brooks, P Barooah, Automatica, 129, 109631, 2021.
- "Reinforcement Learning-Based Home Energy Management System for Resiliency", NS Raman, N Gaikwad, P Barooah, SP Meyn, 2021, American Control Conference, 1358-1364.
- "Model predictive control for energy-efficient HVAC operation with humidity and latent heat considerations", NS Raman, K Devaprasad, B Chen, HA Ingley, P Barooah, Applied Energy, vol. 279, 115765, 2020.
- "Characterizing capacity of flexible loads for providing grid support", AR Coffman, Z Guo, P Barooah, IEEE Transactions on Power Systems, vol. 36 (3), 2428-2437, 2020
- "Coordination of loads for ancillary services with Fourier domain consumer QoS constraints", J Brooks, P Barooah, IEEE Transactions on Smart Grid, 10 (6), 6148-6155, 2019

KEY AWARDS

- FSMP visiting fellowship, 2017,Awarded by the Fondation Sciences Mathematiques de Paris (FSMP)
- Endeavour Executive Fellowship, 2016, Awarded by the Dept. of Education and Training, Government of Australia
- ASEE-SE (American Society of Engineering Education - South East Section)'s New Faculty Research Award, 1st place, 2012
- National Science Foundation (NSF) Faculty Early Career Development (CAREER) award, 2010
- Best Paper Award, 2nd International Conference on Intelligent Sensing and Information Processing (ICISP), 2005
- NASA Group Achievement Award, 2003

EDUCATION

Ph.D. 2007 University of California, Santa Barbara

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JONATHAN BROOKS

INSTRUCTIONAL ASSISTANT PROFESSOR

KEYWORDS

Numerical methods, control systems, and optimization.

OVERVIEW

Professor Brooks' teaching interests include numerical methods, control systems, and optimization. He earned his Ph. D. from the University of Florida in Mechanical Engineering in 2017 and became a MAE faculty member the following year. He wishes to want to use my expertise in control and optimization in a way that will bring the future a little bit closer. This includes smart buildings, smart grids, and smart cities.

SELECTED PUBLICATIONS

- Brooks, J., & Barooah, P. (2014). Energy-efficient control of under-actuated HVAC zones in buildings. 2014 American Control Conference. https://doi.org/10.1109/acc.2014.6859151
- Brooks, J., Goyal, S., Subramany, R., Lin, Y., Middelkoop, T., Arpan, L., Carloni, L., & Barooah, P. (2014). An experimental investigation of occupancy-based energy-efficient control of commercial building indoor climate. 53rd IEEE Conference on Decision and Control. https://doi.org/10.1109/cdc.2014.7040278
- Brooks, J., Goyal, S., Subramany, R., Lin, Y., Liao, C., Middelkoop, T., Ingley, H., Arpan, L., & Barooah, P. (2015). Experimental evaluation of occupancy-based energy-efficient climate control of Vav Terminal Units. Science and Technology for the Built Environment, 21(4), 469–480. https://doi.org/10.1080/23744731.2015.1023162
- Brooks, J., & Barooah, P. (2016). Consumer-aware load control to provide contingency reserves using frequency measurements and inter-load communication. 2016 American Control Conference (ACC). https://doi.org/10.1109/acc.2016.7526147
- Brooks, J., & Barooah, P. (2014). Energy-efficient control of under-actuated HVAC zones in buildings. 2014 American Control Conference. https://doi.org/10.1109/acc.2014.6859151
- Brooks, J., Hager, W., & Zhu, J. (2015). A decentralized multi-block ADMM for demand-side primary frequency control using local frequency measurements. arXiv preprint arXiv:1509.08206.

KEY AWARDS

EDUCATION

Ph.D., 2017, University of Florida

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CRISTIAN CARDENAS-LAILHACAR

ENGINEER

KEYWORDS

Energy Management, Sustainability, Molecular Structure Optimization

OVERVIEW

Dr. Cardenas-Lailhacar's research is focused on energy management, energy efficiency, energy policy, energy technology, molecular structure optimization and chemical reactivity. His team works in the development of new algorithms for non-conventional renewable energy sources forecasting (solar and wind), manufacturing process optimization, heat recovery, and cogeneration.

SELECTED PUBLICATIONS

- Sherif, S.A., Cardenas-Lailhacar, C., et. al., "Industrial Energy Audits to Florida Industries". Published 69 peer reviewed (No. UF0501 to UF0569), Office of EERE, US DOE, Dept. of Mechanical and Aerospace Engineering, University of Florida, Gainesville, Florida, December 2016 – October 2021.
- Raineri, R. with Contreras, J.M. and Cardenas-Lailhacar. C. "Energy Transition in Chile: An Uncomfortable Truth". Latin American Center on Economic and Social Policies at Pontifical Catholic University (CLAPES-UC). Work Document No. 39. 2018.
- Schwager Energy, Cardenas-Lailhacar, C. et. al. "Energy Efficiency Handbook for the Chilean Canned Food Industry)". Written for the Chilean Food Companies Society and the Chilean Energy Efficiency Agency (AChEE). 2012, 76 pages.
- V. Silva and C. Cardenas-Lailhacar, Motors Efficiency Estimation and Its Evaluation in Energy Analysis. Encyclopedia of Energy Engineering and Technology, Vol. #4. B. Capehart Ed. CRC Press, Taylor & Francis, 2008.
- Smith, C.B. and Cardenas-Lailhacar, C., "Lesser Known Energy Sources: A Study of Biogas and Tired-Based Fuel." Cogeneration and Distributed Generation Journal. Vol. 23, No. 2, p 35-72. 2008.
- Cardenas-Lailhacar, C., Chapter 6: "Finding Transition States Using the LTP Algorithm"; Chapter 14: "Hardness and the Potential Energy Function in Internal Rotations.", Pardalos & Principe Eds. Biocumputing, Kluwer AP 2002.

KEY AWARDS

- The 2010 Chilean MiningRound Table Energy Efficiency Award.
- The Professor Honoris Causa Award - Universidad Nacional de San Martin, Peru, 2010.
- The Honorary Professor – Graduate School Award from Universidad Nacional Daniel Alcides Carrion, Perú, 2007.
- The Honorary Professor Award from Universidad Privada del Norte Perú, 2005.
- The 2005 Siemens International Award - Foundation of the Association of Energy Engineers, 2005.
- The Universal Peace Federation Medal, Peru, 2005.
- The UF ISE 2005 Outstanding Faculty Award. IIE Chapter.

AEE LIFE MEMBER

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BRUCE F. CARROLL

ASSOCIATE PROFESSOR

KEYWORDS

Engineering Education, Mixed-Methods, Proactive Advising Systems, Data Analytics, Explainable AI

OVERVIEW

Professor Carroll's current research centers on engineering education, survey methods, sequential mixed methods, identity theory, and multiple identities with applications to improving diversity, equity, and inclusion within the engineering profession. I often find overlaps with my past work in aerodynamics, pressure/temperature sensitive coatings, aero-optics, and shock-wave boundary layer interactions.

SELECTED PUBLICATIONS

- Thiyagarajah, M., Crippen, K., Carroll, B., Johns, T., “Should Professional Engineering Identity be the only Identity Considered when Developing Programs?,” ASEE Annual Conference, Paper No. 37289, June 2022.
- Abbitt, J. A. and Carroll, B. F., "Applied Aerodynamics Experience for Secondary Science Teachers and Students," Journal of Engineering Education, Vol. 82, No. 3, July 1993, pp 185188.
- Carroll, B. F., Hubner, J. P., Schanze, K. S., Bedlek-Anslow, J. M., “Principal Component Analysis of Dual-Luminophore Pressure/Temperature Sensitive Paints,” Journal of Visualization, The Visualization Society of Japan, Vol. 4, No. 2, 2001, pp. 121-129.
- Kose, M. E., Omar, A., Carroll, B. F., Virgin, C. A., and Schanze, K. S., “Principal Component Analysis Calibration Method for Dual Luminophore Oxygen and Temperature Sensor Films: Application to Luminescence Imaging,” Langmuir, 2005, 21 (20), pp 9110-9120.
- Gallas, Q., Holman, R., Carroll, B., Nishida, T., Sheplak, M., and Cattafesta, L., “Lumped Element Modeling of Piezoelectric-Driven Synthetic Jet Actuators,” AIAA Journal, Vol. 41, No. 2, February 2003, pp. 240-247.

KEY AWARDS

- 2020 International Educator of the Year Award, College of Engineering, University of Florida
- 2018 Chair of Excellence, University Carlos III Madrid, Spain

EDUCATION

Ph.D. 1988
University of Illinois at Urbana-Champaign

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OANA CAZACU

CHARLES E. TAYLOR PROFESSOR

KEY WORDS

Anisotropy, Damage, Plasticity, Impact

OVERVIEW

Professor Cazacu's research expertise is in theoretical and computational mechanics aimed at finding new ways to extend the range of applications of existing materials, and virtual designing of new materials/microstructures for enhanced performance. She is world renowned for contributions to constitutive modeling of non-linear deformation, damage, and fracture with applications ranging from non-traditional manufacturing processes to impact, virtual testing and evaluation. Her work is making direct impact on engineering practice as her anisotropic plasticity models have been integrated into advanced general-purpose multi-physics simulation commercial and government finite-element software.

SELECTED PUBLICATIONS

- O. Cazacu, B. Revil-Baudard, N. Chandola Plasticity-Damage Couplings: From Single Crystal to Polycrystalline Materials", Springer, 2019;
- O. Cazacu, B. Revil-Baudard Plasticity of Metallic Materials: Modelling and Applications to Metal Forming, Elsevier, 2021;
- O. Cazacu, B. Plunkett and F. Barlat [2006] Orthotropic yield criterion for hexagonal closed packed materials. Int. J. Plasticity, 22, 1171-1194.
- O. Cazacu, B. Revil-Baudard, and F. Barlat [2013] New interpretation of monotonic Swift effects: Role of the tension-compression asymmetry. Mechanics of Materials, 57, 42-52.
- O. Cazacu and J. B. Stewart [2009] Plastic potentials for porous aggregates with the matrix exhibiting tension-compression asymmetry. Journal of Mechanics and Physics of Solids, 57, 325-341.
- O. Cazacu and B. Revil-Baudard [2016] New analytic criterion for porous solids with pressure-insensitive matrix, Int. J. Plasticity, 89, 66-84.
- O. Cazacu and J. A. Rodríguez-Martínez [2019] Effects of plastic anisotropy on localization in orthotropic materials: new explicit expressions for the orientation of localization bands in flat specimens subjected to uniaxial tension. J. Mech. Physics. Solids, 126, 272-284.

KEY AWARDS

- 2020 International Educator of the Year Award, College of Engineering, University of Florida
- 2018 Chair of Excellence, University Carlos III Madrid, Spain

IEEE & ASME FELLOW

EDUCATION

H.D.R 2004, D.S. 1995
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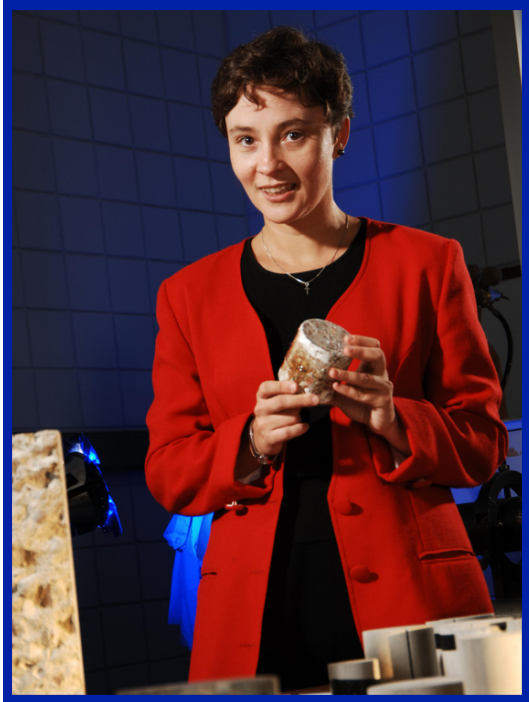

YOUPING CHEN

PROFESSOR

KEYWORDS

Atomistic and continuum formulations, multiscale modeling and simulation, material failure, phonon transport, heterostructures.

OVERVIEW

Professor Chen's research is focused on theoretical formulation and computational tool development for understanding and prediction of microstructural, mechanical, and thermal transport processes in advanced materials or structures from the atomic to the macroscopic. Her laboratory uses atomistic and multiscale simulation tools to study dislocations, fracture, phase transition, epitaxial synthesis, thermal transport in heterostructures, etc. Specific emphasis is placed on heterostructure electronics, thermoelectric materials, high-strength armor materials, structural biological materials, and materials with complex microstructures or high-density interfaces.

SELECTED PUBLICATIONS

- Diaz, A., B. Gu, Y. Li, S.J. Plimpton, D.L. McDowell, and Y. Chen, A parallel algorithm for the concurrent atomistic-continuum methodology. Journal of Computational Physics, 2022: p. 111140.
- Chen, Y. and A. Diaz, Physical foundation and consistent formulation of atomic-level fluxes in transport processes. Physical Review E, 2018. 98(5): p. 052113.
- Yang, S. and Y. Chen, Concurrent atomistic and continuum simulation of bi-crystal strontium titanate with tilt grain boundary. Proceedings of the Royal Society A: Mathematical, Physical & Engineering Sciences, 2015. 471(2175).
- Xiong, L., J. RigelesaiyinG, X. ChenG, S. XuG, D.L. McDowell, and Y. Chen, Coarse-grained elastodynamics of fast-moving dislocations. Acta Materialia, 2016. 104: p. 143-155.
- Zhang, N. and Chen, Y., Molecular origin of the sawtooth behavior and the toughness of nacre. Materials Science and Engineering: C, 2012. 32(6): p. 1542-1547.

KEY AWARDS

- Herbert Wertheim College of Engineering Doctoral Dissertation Advisor/Mentoring Award 2022
- DOE Early Career Award, 2011-2017
- DARPA Young Faculty Award, 2010-2013

EDUCATION

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JACOB N. CHUNG

ANDREW H. HINES, JR./FLORIDA PROGRESS PROFESSOR

KEYWORDS

Phase-Change Heat Transfer, Microgravity Thermal-Fluid Management, Biomass and Solid Waste Conversion to biofuels

OVERVIEW

Professor Chung's research activities have been in the general areas of fluid mechanics and heat transfer with a special focus on phase-change heat transfer, multiphase flows, particle dispersion in large-scale structure dominated turbulent flows, laminar-turbulent transition in heated flows, and turbulence in heated flows. Recently his research is focused on micro-scale thermal transport phenomena, molecular dynamics simulation of boiling nucleation, thermal-fluid transport in fuel cell systems, and biomass and solid waste conversion to energy and biofuels by thermal-chemical gasification, microgravity cryogenic pipe quenching and propellant storage tank thermal-fluid management.

SELECTED PUBLICATIONS

- Uisung Lee, J. N. Chung, H. A. Ingley, High-Temperature Steam Gasification of Municipal Solid Waste, Rubber, Plastic and Wood, Energy and Fuels, Vol. 28, pp. 4573-4587 (2014).
- S.C. Maroo and J. N. Chung, Fundamental Roles of Non-evaporating Film and Ultra-High Heat Flux Associated with Nanoscale Meniscus Evaporation in Nucleate Boiling, ASME J. Heat Transfer, 75th Anniversary Special Edition, Vol. 135, Article 061501 (10 pages), (2013).
- J. N. Chung, A Theoretical Study of Two Novel Concept Systems for Maximum Thermal-Chemical Conversion of Biomass to Hydrogen, Frontiers in Energy Research, Vol. 1, Article 12 (pp. 1-10), January, 2014.
- A.H. Abdulrahim and J. N. Chung, Hybridizing power and water cogeneration plants with biomass steam gasification systems: An Energy-Water-Waste (EW2) nexus case study, Energy Conversion and Management, Vol. 185, pp. 654-669, 2021.
- J. N. Chung, Jun Dong, Hao Wang, S. R. Darr, J.W. Hartwig, An advance in transfer line chilldown heat transfer of cryogenic propellants in microgravity using microfilm coating for enabling deep space exploration, Nature Partner Journal (NPJ): Microgravity, 7:21 (2021).

KEY AWARDS

- AIAA Distinguished Leadership and Service Award, 1995.
- Elected to the ASME Fellow, 1996.
- ASME Heat Transfer Division Journal of Heat Transfer Associate Editor Achievement Award
- University of Florida, College of Engineering, Doctoral Dissertation Advisor/Mentor of the Year Award, 2007-2008.
- ASME Heat Transfer Division "2013 Heat Transfer Memorial Award".

ASME FELLOW

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JOHN W. CONKLIN

KNOX MILLSAPS ASSOCIATE PROFESSOR

KEYWORDS

Development of precision instruments for spacecraft Position, Navigation, Timing and Gravity (PNTG), and the design and analysis of space missions that depend heavily on these technologies

OVERVIEW

SELECTED PUBLICATIONS

- H. Inchauspé, T. Olatunde, S. Apple, S. Parry, B. Letson, N. Turetta, G. Mueller, P.J. Wass, J.W. Conklin, “Numerical modeling and experimental demonstration of pulsed charge control for the space inertial sensor used in LISA”, Physical Review D, Vol. 102, No. 4, pp. 042002, (2020).
- H. Hong, J. W. Conklin, “Finding the suitable drag-free acceleration noise level for future low-low satellite-to-satellite tracking geodesy missions”, Advances in Space Research, Vol. 63, No. 1, pp. 32-50, (2019).
- J. Anderson, N. Barnwell, M. Carrasquilla, J. Chavez, O. Formoso, A. Nelson, T. Noel, S. Nydam, J. Pease, F. Pistella, T. Ritz, S. Roberts, P. Serra, E. Waxman, J. W. Conklin, W. Attai, J. Hanson, A.N. Nguyen, K. Oyadomari, C. Priscal, J. Stupl, J. Wolfe, B. Jaroux, “Sub-nanosecond ground-to-space clock synchronization for nanosatellites using pulsed optical links”, Advances in Space Research, Vol. 62, No. 1, pp. 3475-3490, (2018).
- D. Bortoluzzi, M. Benedetti, J. W. Conklin, “Measurement of metallic adhesion force-to-elongation profile under high strain-rate conditions”, Experimental and Applied Mechanics, Vol. 4, pp. 67-74, (2013).
- C. W. F. Everitt, D. B. DeBra, B. W. Parkinson, J. P. Turneaure, J. W. Conklin, M. I. Heifetz, G. M. Keiser, A. S. Silbergleit, T. Holmes, J. Kolodziejczak, M. Al-Meshari, J. C. Mester, B. Muhlfelder, V. G. Solomonik, K. Stahl, P. W. Worden Jr., W. Bencze, S. Buchman, B. Clarke, A. Al-Jadaan, H. Al-Jibreen, J. Li, J. A. Lipa, J. M. Lockhart, B. Al-Suwaidan, M. Taber, S. Wang, “Gravity Probe B: Final Results of a Space Experiment to Test General Relativity”, Physical Review Letters, Vol. 106, No 22, p. 221101, (2011).

KEY AWARDS

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KERRY COSTELLO

ASSISTANT PROFESSOR

KEYWORDS

Biomechanics, physical activity, osteoarthritis, machine learning

OVERVIEW

Dr. Costello's research focuses on understanding the role of movement biomechanics and physical activity in musculoskeletal health, with an emphasis on knee osteoarthritis. This work utilizes motion capture, wearable sensors and machine learning to examine how time-varying, multidimensional joint loads experienced during human movement contribute to disease progression. She recently received a career development award through the Rheumatology Research Foundation to study the role of physical activity patterns in knee osteoarthritis progression using deep learning.

SELECTED PUBLICATIONS

- Costello KE, Felson DT, Jafarzadeh SR, Guermazi A, Roemer FW, Segal NA, Lewis CE, Nevitt MC, Lewis CL, Kolachalama VB, Kumar D. Tibiofemoral cartilage worsening in persons without advanced radiographic osteoarthritis: A machine learning analysis of gait and physical activity in the Multicenter Osteoarthritis Study. [preprint] medRxiv; doi: 10.1101/2022.06.30.22277057.
- Costello KE, Astephen Wilson JL, Hubley-Kozey CL. Association of low physical activity levels with gait patterns considered "at risk" for clinical knee osteoarthritis progression. Arthritis Care & Research Open Rheumatology 3(11): 753-763, 2021 [Epub Oct 2021]; doi: 10.1002/acr2.11319.
- Costello KE, Felson DT, Neogi T, Segal NA, Lewis CE, Gross KD, Nevitt MC, Lewis CL, Kumar D. Ground reaction force patterns in knees with and without radiographic osteoarthritis and pain: descriptive analyses of a large cohort (the Multicenter Osteoarthritis Study). Osteoarthritis & Cartilage 29(8):1138-1146, 2021 [Epub Mar 2021]; doi: 10.1016/j.joca.2021.03.009.
- Costello KE, Eigenbrot S, Geronimo A, Guermazi A, Felson DT, Richards J, Kumar D. Quantifying varus thrust in knee osteoarthritis using wearable inertial sensors: a proof of concept. Clinical Biomechanics 80, 2020 (Online ahead of print); doi: 10.1016/j.clinbiomech.2020.105232.
- Costello KE, Guilak F, Setton LA, Griffin TM. Locomotor activity and gait in aged mice deficient for type IX collagen. J Appl Physiol 109: 211-218, 2010; doi: 10.1152/japplphysiol.00056.2010.

KEY AWARDS

- 2020 National Institutes of Health F32 Individual Postdoctoral Fellowship
- 2018 National Institutes of Health T32 Postdoctoral Fellowship
- 2014 Izaak Walton Killam Memorial Scholarship
- 2008 Fulbright Scholarship

EDUCATION

Ph.D. 2018
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CARL D. CRANE III

PROFESSOR

KEY WORDS

Spatial mechanisms, robotics, autonomous ground vehicles

OVERVIEW

Dr. Cranes's research focuses on the areas of spatial mechanisms, tensegrity systems, robotics, and autonomous navigation for over twenty five years. Current activities include the development and implementation of system architectures for autonomous ground vehicle navigation and the design and implementation of passive parallel mechanisms to be used for force control applications.

SELECTED PUBLICATIONS

- Kim, Junghyun & Crane, Carl & Kim, Jungha. (2022). Development of the Autonomous Navigation Algorithm based on the Geometric Method for Skid Steering Vehicles: Convergence of Skid Steering and Pure Pursuit Methods Using Compensation Coefficients. 1996-2001. 10.23919/ICCAS55662.2022.10003669.
- Shin, Heeseok & Kim, Myeong-Jun & Baek, Sunwoo & Crane, Carl & Kim, Jungha. (2022). Perpendicular Parking Path Generation and Optimal Path Tracking Algorithm for Auto-parking of Trailers. International Journal of Control, Automation and Systems. 20. 10.1007/s12555-021-0268-9.
- Shin, Heeseok & Kim, Myeong-Jun & Crane, Carl & Kim, Jung-Ha. (2022). A Research on Path Generating and Tracking Algorithm for Auto Valet Parking System Based on Improved Sensor Performance. Journal of Electrical Engineering & Technology. 17. 10.1007/s42835-021-00983-3.
- Sargolzaei, Arman & Zegers, Federico & Abbaspour, Alireza & Crane, Carl & Dixon, Warren. (2022). Secure Control Design for Networked Control Systems With Nonlinear Dynamics Under Time-Delay-Switch Attacks. IEEE Transactions on Automatic Control. PP. 1-1. 10.1109/TAC.2022.3154354.
- Frank, Daniel & Douglas, Elliot & Williams, Darryl & Crane, Carl. (2021). Investigating culturally contextualized making with the Navajo Nation. Journal of Engineering Education. 110. 10.1002/jee.20423.

KEY AWARDS

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DAN DICKRELL

PROFESSOR AND DEPARTMENT CHAIR

KEYWORDS

Engineering Mechanics, Engineering Design, Computer Programming for Engineers, Computational image analysis, Electrical contact mechanics, Tribology, Engineering education methods for very-large enrollment courses

OVERVIEW

Professor Dickrell's research focuses on computational image analysis, electrical contact mechanics, tribology, and engineering education methods for very-large enrollment courses. He earned a Ph. D in Mechanical Engineering from the University of Florida in 2006 and has a decade of teaching experience in undergraduate engineering specializing in ultra-large enrollment courses (300+ students) and video-delivery of content.

SELECTED PUBLICATIONS

- D. J. Dickrell and M. T. Dugger, "Electrical Contact Resistance Degradation of a Hot-Switched Simulated Metal MEMS Contact," in IEEE Transactions on Components and Packaging Technologies, vol. 30, no. 1, pp. 75-80, March 2007, doi: 10.1109/TCAPT.2007.892074.
- Jeffrey R. Lince, Hyun I. Kim, Paul M. Adams, Daniel J. Dickrell, Michael T. Dugger, Nanostructural, electrical, and tribological properties of composite Au–MoS2 coatings,Thin Solid Films, Volume 517, Issue 18, 2009, Pages 5516-5522, ISSN 0040-6090, https://doi.org/10.1016/j.tsf.2009.03.210.
- Dickrell , D. J., III, Dooner, D. B., and Sawyer, W. G. (December 31, 2002). "The Evolution of Geometry for a Wearing Circular Cam: Analytical and Computer Simulation With Comparison to Experiment ." ASME. J. Tribol. January 2003; 125(1): 187–192. https://doi.org/10.1115/1.1504092
- D. J. Dickrell and M. T. Dugger, "The effects of surface contamination on resistance degradation of hot-switched low-force MEMS electrical contacts," Proceedings of the Fifty-First IEEE Holm Conference on Electrical Contacts, 2005., Chicago, IL, USA, 2005, pp. 255-258, doi: 10.1109/HOLM.2005.1518252.
- Angelini, T. E., Dunn, A. C., Urueña, J. M., Dickrell, D. J., Burris, D. L., & Sawyer, W. G. (2012). Cell friction. Faraday Discussions, 156, 31. https://doi.org/10.1039/c2fd00130f
- D. J. Dickrell, M. T. Dugger, M. A. Hamilton and W. G. Sawyer, "Direct Contact-Area Computation for MEMS Using Real Topographic Surface Data," in Journal of Microelectromechanical Systems, vol. 16, no. 5, pp. 1263-1268, Oct. 2007, doi: 10.1109/JMEMS.2007.901120.

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WARREN DIXON

PROFESSOR AND DEPARTMENT CHAIR

KEYWORDS

Nonlinear Control, Robotics, AI, Reinforcement Learning

OVERVIEW

Professor Dixon's research is focused on the development of control methods for automated and robotic systems that exhibit uncertain nonlinear behaviors. His laboratory uses nonlinear, Lyapunov-based, design and stability analysis approaches. Specific emphasis is placed on designs with intermittent feedback and the development of adaptive, learning, and artificial intelligent control methods. Specific applications include assured autonomous systems in contested environments, networked robotics, image-based feedback, rehabilitation engineering and human machine interface, and aerospace and maritime systems.

SELECTED PUBLICATIONS

- C. Rouse, C. A. Cousin, B. C. Allen, and W. E. Dixon, "Shared Control for Switched Motorized FES-Cycling on a Split-Crank Cycle Accounting for Muscle Control Input Saturation," Automatica, Vol. 123, pp. 1-11 (2021).
- P. Deptula, H.-Y. Chen, R. Licitra, J. Rosenfeld, and W. E. Dixon, "Approximate Optimal Motion Planning to Avoid Unknown Moving Avoidance Regions," IEEE Trans. on Robotics, Vol. 36, No. 2, pp. 414-430 (2020).
- R. Kamalapurkar, P. S. Walters, J. A. Rosenfeld, W. E. Dixon, Reinforcement Learning for Optimal Feedback Control: A Lyapunov-based Approach, Springer, 2018.
- T.-H. Cheng, Z. Kan, J. R. Klotz, J. M. Shea, and W. E. Dixon, "Event-Triggered Control of Multi-Agent Systems for Fixed and Time-Varying Network Topologies," IEEE Transactions on Automatic Control, Vol. 62, No. 10, pp. 5365-5371 (2017).
- P. M. Patre, W. MacKunis, K. Kaiser, and W. E. Dixon, "Asymptotic Tracking for Uncertain Dynamic Systems via a Multilayer Neural Network Feedforward and RISE Feedback Control Structure," IEEE Transactions on Automatic Control, Vol. 53, No. 9, pp. 2180-2185 (2008).

KEY AWARDS

2020 IEEE Control Systems Society Distinguished Member Award 2019 IEEE Control Systems Technology Award, 2015 & 2009 American Automatic Control Council O. Hugo Schuck (Best Paper) Award, 2011 American Society of Mechanical Engineers (ASME) Dynamics Systems and Control Division Outstanding Young Investigator Award, the 2006 IEEE Robotics and Automation Society Early Academic Career Award, NSF CAREER Award (2006-2011), Air Force Commander's Public Service Award (2016) for his contributions to the U.S. Air Force Science Advisory Board.

IEEE & ASME FELLOW

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DR. TING DONG

INSTRUCTIONAL ASSISTANT PROFESSOR

KEYWORDS

Prognostics and health management, maintenance of aircraft structure

OVERVIEW

Professor Dong's research is focused on prognostics and health management of aircraft structures. Instead of scheduled maintenance with manual inspection currently used in the industry, structural health monitoring sensors are installed on aircraft to detect damages in real time. With data collected from sensors, different prognostic methods such as Bayesian inference and neural networks are used to predict how the damages propagate. Structural maintenance is only required when prognostic results show the damages exceeding a threshold. With this condition-based maintenance, not only the safety of the aircraft structure is improved, but also the maintenance cost and downtime are reduced.

SELECTED PUBLICATIONS

- Ting Dong and Nam H. Kim, Methods of identifying correlated model parameters with noise in prognostics, Aerospace, Vol. 8, pp. 129-1-14, 2021.
- Nam H. Kim, Ting Dong, David Weinberg, and Jonas Dalidd, Generalized optimality criteria method for topology optimization, Applied Sciences, Vol. 11, pp. 3175, 2021.
- Ting Dong, Raphael T. Haftka, and Nam H. Kim, Advantages of condition-based maintenance over scheduled maintenance using structural health monitoring system, Reliability and Maintenance--An overview of Cases, Ed. L. Kounis, pp. 1-20, 2020.
- Ting Dong, Dawn An, and Nam H. Kim, Prognostics 102: Efficient Bayesian-based prognostics algorithm in MATLAB, Prognostics, pp. 1-25, 2019.
- Ting Dong and Nam H. Kim, Cost-effectiveness of structural health monitoring in fuselage maintenance of civil aviation industry , Aerospace, Vol. 5, No. 3, pp. 87, 2018.

KEY AWARDS

- Excellence in Teaching Innovation Award 2022
- People's Choice Award in Three Minute Thesis Florida Statewide Competition 2018
- Runner-up in Three Minute Thesis UF competition 2017
- Knox T. Millsaps Graduate Teaching Assistant Award 2018

EDUCATION

Ph.D. 2020
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Z. HUGH FAN

PROFESSOR AND DIRECTOR OF INTERDISCIPLINARY MICROSYSTEMS GROUP (IMG)

KEYWORDS

Microfluidics, bioMEMS, Sensors, Bioengineering

OVERVIEW

Professor Fan's research is focused on (1) fabrication technologies, including thermoplastic manufacturing processes and non-traditional methods; (2) microflows, including fluid behavior, flow controls, and platform integration; and (3) microfluidics applications. Microfluidics is promising to reach the holy grail of "lab-on-a-chip". In analogy to shrinking a computer from the size of a room in the 1950s to a laptop today, instruments for chemical and biological analyses could be miniaturized using modern microfabrication technology. Potential applications of the portable, miniaturized devices include point-of-care testing, environmental monitoring, and detection of pathogens or biowarfare agents in the field.

SELECTED PUBLICATIONS

- K. Chen, J. Amontree, J. Varillas, J. Zhang, T. J. George, Z. H. Fan, "Incorporation of Lateral Microfiltration with Immunoaffinity for Enhancing the Capture Efficiency of Rare Cells", Scientific Reports, 10, 2020, 14210.
- K. Sondhi, N. Garraud, D. Alabi, D. P. Arnold, A. Garraud, S.G.R. Avuthu, Z. H. Fan, T. Nishida, "Flexible Screen-Printed Coils for Wireless Power Transfer Using Low-Frequency Magnetic Fields", Journal of Micromechanics and Microengineering, 29, 2019, 084006.
- X. Jiang, J. C. Loeb, C. Manzanas, J. A. Lednicky, Z. H. Fan, "Valve-enabled Sample Preparation and RNA Amplification in a Coffee Mug for Zika Virus Detection", Angewandte Chemie International Edition, 57, 2018, 17211–17214.
- W. Sheng, T. Chen, W. Tan, and Z. H. Fan, "Multivalent DNA nanospheres for enhanced capture of cancer cells in microfluidic devices," ACS Nano, 7, 2013, 7067–7076.
- K. Pitchaimani, B. C. Sapp, A. Winter, A. Gispanski, T. Nishida, Z. H. Fan, "Manufacturable Plastic Microfluidic Valves Using Thermal Actuation," Lab on a Chip, 9, 2009, 3082–3087

KEY AWARDS

- UF Term Professorship, 2016-2022
- UF Research Foundation Professorship, 2014-2017
- "Best Paper" award (MEMS Division), ASME's IMECE meeting, 2013
- Career Award (K25), National Institutes of Health, 2011-2016
- Fraunhofer-Bessel Award, Humboldt Foundation (Germany), 2010
- E.T.S. Walton Award, Science Foundation Ireland, 2009

AAAS, AIMBE, & ASME FELLOW

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NORMAN FITZ-COY

ASSOCIATE PROFESSOR

KEY WORDS

Spacecraft collision, space debris, space swarm systems, multibody dynamics, game theory, orbital mechanics

OVERVIEW

Dynamics and controls of space vehicles. With the current interest in smaller space vehicles, Professor Fitz-Coy has been developing strategies for distributed space systems, specifically focusing on swarms of spacecraft systems for mission assurance and safety. In addition, he has been focused on the collisions between space vehicles and characterization of resulting space debris. He has also worked in, and still has interest in, multibody dynamical systems, game theory, and orbital mechanics.

SELECTED PUBLICATIONS

- “Evaluation of Murrell's EKF-Based Attitude Estimation Algorithm for Exploiting Multiple Attitude Sensor Configurations,” Sensors, 2021, Vol. 21, No 19, (with Sharan Asundi and Haniph Latchman)
- “Velocity Extrema in Keplerian Relative Motion: A Grobner Basis Approach,” in Journal of Astronautical Sciences, 2021, Vol 68, No. 2, (with Shawn Allgeier and Richard Scott Erwin)
- “CubeSat Adaptive Attitude Control with Uncertain Drag Coefficient and Atmospheric Density” in Journal of Guidance, Control, and Dynamics, 2020, Vol. 44, No. 2, pp. 379-388 (with R. Sun, C. Riano-Rios, R. Bevilacqua, and Warren Dixon)
- “DebriSat Fragment Characterization: Quality Assurance,” Journal of Space Safety Engineering. 2020, DOI: 10.1016/J.Jsse.2020.08.001 (with Samantha Allen)
- "Updates to the DebriSat Project in Support of Improving Breakup Models and Orbital Debris Risk Assessments." In Hypervelocity Impact Symposium, vol. 883556, p. V001T10A012. American Society of Mechanical Engineers, 2019 (with Cowardin, Heather, Phillip Anz-Meador, James Murray, J-C. Liou, Eric Christiansen, Marlon Sorge, Norman Fitz-Coy, and Tom Huynh).

KEY AWARDS

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HITOMI YAMAGUCHI GREENSLET

PROFESSOR AND GRADUATE COORDINATOR

KEYWORDS

Manufacturing, Surface Functionalization, Magnetic Field-Assisted Finishing (MAF), Medical Device Development

OVERVIEW

Professor Greenslet's research focuses on the use of ultra-precision surface modification and surface functionalization to respond to increasingly challenging industry demands. Her major research interests include (1) Nanometer-scale polishing of optical components using MAF; (2) Functional surface fabrication using MAF for complex components, which influence tribological properties, surface wettability, and light reflectivity; (3) Microstructure-mechanical property-surface geometry relationship for metallic components made using additive manufacturing; (4) Magnetic field-assisted single point incremental forming; and (5) Medical device development (e.g., stents, needle-biopsy system for cancer patients).

SELECTED PUBLICATIONS

- Long J., Kamimura T., Marui H., Tsunezuka Y., Uemura A., Yamaguchi H. (2022) Iron-Particle-Polishing-Tool Behavior during Magnetic Field-Assisted Finishing of Fused Silica. CIRP J Manuf Sci Technol, 38:675-683.
- Buffa G., Yamaguchi H., Gucciardi M., Pinard D., Fratini L. (2021) Magnetic Field-Assisted Single-Point Incremental Forming. CIRP Annals, 70(1):265-268.
- Wu P.-Y., Hirtler M. Bambach M., Yamaguchi H. (2020) Effects of Build- and Scan-Directions on Magnetic Field-Assisted Finishing of 316L Stainless Steel Disks Produced with Selective Laser Melting. CIRP J J Manuf Sci Technol, 31:583-594.
- Yamaguchi H., Li M., Hanada K. (2019) Surface Finishing of Biodegradable Stents. CIRP Annals, 68(1):357-360.
- Wu P.-Y., Kahraman H., Yamaguchi H. (2017) Development of Aspiration-Assisted End-Cut Coaxial Biopsy Needles. ASME J Med Devices, 11(1):011012.

KEY AWARDS

- B2021 Numata Memorial Paper Award, Japan Society for Precision Engineering (JSPE)
- Best Paper Award (second runner-up), 2010 International Manufacturing Science and Engineering Conference (MSEC2010), Manufacturing Engineering Division, American Society of Mechanical Engineers (ASME/MED)
- Certificate of Merit for Excellent Paper of the 3rd International Conference on Materials and Processing (ICMP2008), Materials and Processing Division of Japan Society of Mechanical Engineers (JSME)
- Best Paper Award (first place), MSEC2006, ASME/MED
- 2000 John T. Parsons Outstanding Young Manufacturing Engineer Award of Society of Manufacturing Engineers

SME & ASME FELLOW

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MICHAEL GRIFFIS

SENIOR LECTURER AND UNDERGRADUATE COORDINATOR

KEYWORDS

Mechanisms, Design, Controls, Screw Theory, Kinestatic Mechanical Networks

OVERVIEW

Dr. Griffis specializes in robot control, motion and force control. He studies compliance in the context of design and robot motion/force control.He is a co-inventor of the Griffis-Duffy Platform which is a novel parallel mechanism. Recently, he has studied kinestatic mechanical networks to identify a way to determine mobility of any mechanical device. The new term “kinestatics” denotes a geometric uniting of the sciences of kinematics and statics. He is currently extending this to create multi-dimensional analogies with electrical networks.

SELECTED PUBLICATIONS

- C. Crane, M. Griffis, J. Duffy, Screw Theory and its Application to Spatial Robot Manipulators, Cambridge England, Cambridge University Press, 2022

KEY AWARDS

- 2022 Tau Beta Pi “R.C. Matthews” Outstanding Chapter

EDUCATION

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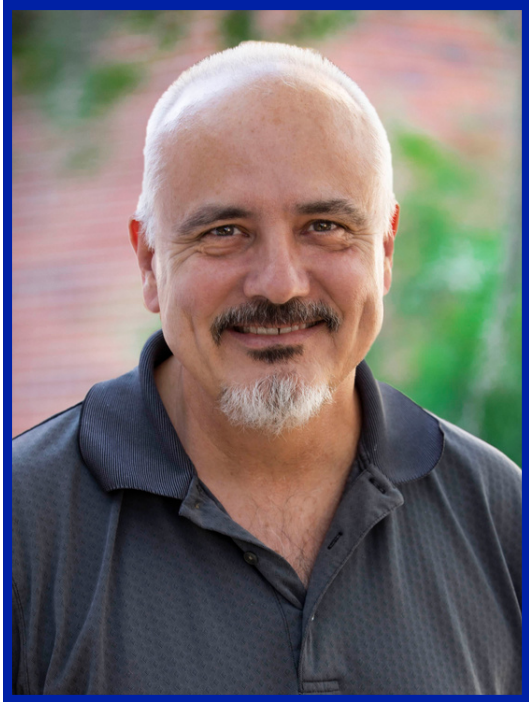

DAN GURALNIK

RESEARCH ASSISTANT SCIENTIST

KEYWORDS

Applied Topology, Robotics, Autonomy, Hybrid Dynamical Systems, AI, Finite Metric Geometry & Clustering, Geometric Group Theory

OVERVIEW

Dr. Guralnik's research in Robotics focuses on the mathematical foundations underlying three major challenges on the way to designing truly autonomous systems: the generation/learning of control structures, understanding topological and information-theoretic properties of quantization structures, and ensuring the dependable execution (safety, stability) of control in complex environments. Specifically, his background in topology and geometry is applied to the study of the complex hybrid control structures which arise naturally in contexts where low-level continuous control is complemented by high-level discrete decision-making ("logic"). Ultimately, the aim of his research is the construction of systems provably capable of adapting to well-defined broad classes of environments through the incorporation of arbitrary sensory input into efficient, well-understood internal representations.

SELECTED PUBLICATIONS

- D. P. Guralnik, P. F. Stiller, F. M. Zegers and W. E. Dixon, "Distributed Cooperative Navigation with Communication Graph Maintenance using Single-Agent Navigation Fields", 2022 American Control Conference, pp. 2160-2165 (2022).
- F. M. Zegers, D. P. Guralnik and W. E. Dixon, "Event/Self-Triggered Multi-Agent System Rendezvous with Graph Maintenance," Proc. IEEE Conf. Decis. Control (2021).
- S. C. Edwards, D. M. Le, D. P. Guralnik and W. E. Dixon, "A Topologically Inspired Path-Following Method with Intermittent State Feedback," IEEE Robot. Autom. Lett., Vol. 6, No.3, pp.4449—4456 (2021).
- D. P. Guralnik and R. Ghrist, "An optimal property of the hyperplane system in a finite cubing," Autonomous Robots, Vol. 45, pp. 665—677 (2021).
- D. P. Guralnik and D. E. Koditschek, "Iterated Belief Revision Under Resource Constraints: Logic as Geometry," preprint (2018).
- J. Culbertson, D. P. Guralnik and P. F. Stiller, "Functorial Hierarchical Clustering with Overlaps", Discr. Appl. Math., Vol. 236, pp. 108—123 (2018).
- O. Arslan, D. P. Guralnik and D.E. Koditschek, "Coordinated Robot Navigation via Hierarchical Clustering," IEEE Trans Robot., Vol. 32, No. 2, pp. 352—371 (2016).
- D. P. Guralnik and E. L. Swenson, "A 'transversal' for minimal invariant sets in CAT(0) boundaries," Trans. Amer. Math. Soc., Vol. 365, No. 6, pp. 3069—3095 (2013).

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MATTHEW HALE

ASSISTANT PROFESSOR

KEYWORDS

Autonomy, Privacy, AI, Robotics

OVERVIEW

Professor Hale's research is centered on the development of reliable multi-agent control and decision algorithms. His research group draws from tools in dynamical systems, operations research, and network science to provide fundamentally new capabilities to multi-agent systems, with an emphasis on practical problems in autonomy and robotics. Of particular interest are problems in learning and control that face information constraints and impairments. Current research directions in this vein include multi-agent systems with asynchronous information sharing among decision-makers and feedback decision systems that must protect data privacy.

SELECTED PUBLICATIONS

- K. Yazdani and M. Hale, "Asynchronous Parallel Nonconvex Optimization Under the Polyak-Łojasiewicz Condition," IEEE Control Systems Letters, vol. 6, pp. 524-529, 2022.
- M. Ubl and M. Hale, "Totally Asynchronous Large-Scale Quadratic Programming: Regularization, Convergence Rates, and Parameter Selection," IEEE Transactions on Control of Network Systems, vol. 8, no. 3, pp. 1465-1476, Sept. 2021.
- P. Gohari, B. Wu, C. Hawkins, M. Hale and U. Topcu, "Differential Privacy on the Unit Simplex via the Dirichlet Mechanism," IEEE Transactions on Information Forensics and Security, vol. 16, pp. 2326-2340, 2021.
- B. Bjorkman, M. Hale, T. D. Lamkin, B. Robinson and C. Thompson, "Nonasymptotic Connectivity of Random Graphs and Their Unions," IEEE Transactions on Control of Network Systems, vol. 8, no. 1, pp. 391-399, March 2021.
- F. M. Zegers, M. T. Hale, J. M. Shea and W. E. Dixon, "Event-Triggered Formation Control and Leader Tracking With Resilience to Byzantine Adversaries: A Reputation-Based Approach," IEEE Transactions on Control of Network Systems, vol. 8, no. 3, pp. 1417-1429, Sept. 2021.

KEY AWARDS

- 2022 ONR YIP for work in communication-denied multi-agent autonomy
- 2020 AFRL Summer Faculty Fellowship for ongoing work in multi-agent learning
- 2020 NSF CAREER Award for work on privacy in control systems
- 2019 UF MAE Department Teacher of the Year
- 2018 Sigma Xi Best PhD Dissertation (Institute-Wide) at Georgia Tech

EDUCATION

Ph.D. 2017
Georgia Tech

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RYAN HOUIM

ASSISTANT PROFESSOR

KEYWORDS

Multiphase reactive flows, combustion, dust dispersal and combustion, detonation initiation, explosion safety, blast physics, hypersonics

OVERVIEW

Professor Houim's research centers on predicting complex highly compressible multiphase reacting flows using massively parallel computational simulations. Applications include dust explosion physics, explosive afterburning, metal particle combustion, hypersonics, and deflagration-to-detonation transition. These flows are inherently multip-physics and incorporate gas dynamics, combustion, particle transport, turbulence, and thermal radiation. Thus, Dr. Houim's research also include the development of models and computational techniques necessary for simulating these complex flow scenarios.

SELECTED PUBLICATIONS

- S. Guhathakurta and R.W. Houim, "Impact of particle diameter and thermal radiation on the explosion of dust layers," Proceedings of the Combustion Institute, In Press, DOI: 10.1016/j.proci.2022.10.011 (2022).
- J.W. Posey, B. Roque, S. Guhathakurta, R.W. Houim, "Mechanisms of prompt and delayed ignition and combustion of explosively dispersed aluminum powder," Physics of Fluids, Vol. 33, pp. 113308 (2021).
- R.W. Houim, "A simplified burn model for simulating explosive effects and afterburning," Shock Waves, Vol. 31, pp. 851-875 (2021).
- R.W. Houim, R.T. Fievisohn, "The influence of acoustic impedance on gaseous layered detonations bounded by an inert gas," Vol. 179, pp. 185-198 (2017).
- R.W. Houim, E.S. Oran, "A multiphase model for compressible granular-gaseous flows: formulation and initial tests," Journal of Fluid Mechanics, Vol. 789, pp. 166-220 (2016).
- R.W. Houim, K.K. Kuo, "A low-dissipation and time-accurate method for compressible multi-component flow with variable specific heats," Journal of Computational Physics, Vol. 230, pp. 8527-8553 (2011).

KEY AWARDS

- 2020 National Science Foundation (NSF) CAREER Award
- 2018 Air Force Office of Scientific Research Young Investigator Program (AFOSR YIP)
- 2012-2013 National Research Council/National Academy of Science (NRC/NAS) Post-Doctoral Fellow

EDUCATION

Ph.D. 2011
The Pennsylvania State University

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YONG HUANG

PROFESSOR

KEYWORDS

Manufacturing process development and monitoring, Additive Manufacturing, Bioprinting/Biofabrication, Advanced materials

OVERVIEW

Professor Huang's research interests are two-fold: 1) processing of biological and engineering materials for healthcare/energy applications, and 2) understanding of dynamic material behavior during manufacturing and process-induced damage or defect structures. His current research topics include design and fabrication of microphysiological systems, manufacture of substance-encapsulated polymeric microgels/microspheres/microcapsules, and three-dimensional (3D) printing of biological and engineering structures from difficult-to-print ink materials using inkjetting, extrusion, and laser-induced forward transfer.

SELECTED PUBLICATIONS

- Compaan, A.M., Song, K., Chai, W., and Huang, Y., "Cross-linkable Microgel Composite Matrix Bath for Embedded Bioprinting of Perfusable Tissue Constructs and Sculpting of Solid Objects," ACS Applied Materials & Interfaces, Vol. 12, pp. 7855-7868, 2020.
- Huang, Y., Wang, L., and Liang, S.Y., Handbook of Manufacturing, World Scientific Publishing, Singapore, pp. 1-725, Oct. 2019.
- Jin, Y., Liu, C., Chai, W., Compaan, A., and Huang, Y., "Self-Supporting Nanoclay as Internal Scaffold Material for Direct Printing of Soft Hydrogel Composite Structures in Air," ACS Applied Materials & Interfaces, Vol. 9(20), pp. 17456-17465, 2017.
- Xiong, R., Zhang, Z., Chai, W., Huang, Y., and Chrisey, D.B., "Freeform Drop-on-Demand Laser Printing of 3D Alginate and Cellular Constructs," Biofabrication, Vol. 7(4), pp. 045011-1-13, 2015.
- Xu, C., Zhang, M., Huang, Y., Ogale, A., Fu, J., and Markwald, R., "Study of Droplet Formation Process during Drop-on-Demand Inkjetting of Living Cell-Laden Bioink," Langmuir, Vol. 30, pp. 9130-9138, 2014.

KEY AWARDS

- ASME Blackall Machine Tool and Gage Award (2005) (best paper),
- Society of Manufacturing Engineers Outstanding Young Manufacturing Engineer Award (2006)
- NSF CAREER Award (2008),
- ASME International Symposium on Flexible Automation Young Investigator Award (2008)
- International Solid Freeform Fabrication (SFF) Symposium Outstanding Paper Award (2009).

ASME FELLOW

EDUCATION

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PETER IFJU

MAE EXCELLENCE TERM PROFESSOR

KEYWORDS

Unmanned aircraft systems, experimental mechanics

OVERVIEW

Peter Ifju's research interests are in Experimental mechanics and unmanned aircraft/watercraft systems. In Experimental mechanics his focus is on optical methods including moiré interferometry, photoelastic coatings and digital image correlation. Test method development. In unmanned systems he concentrates on micro air vehicles, natural resource applications, fluid/structure interaction, eVTOLs

SELECTED PUBLICATIONS

- Isaly, A. Diaz, M. Divaker, R. Earl, L. Murphy, A. Ortega, T. Whitley, S. Deleon, M. Griffis, P.G. Ifju, "The Unmanned Foil (UF): An Autonomous, Retractable–Mast Electromechanical Hydrofoil," Naval Engineers Journal 133 (1), 49-68, 2021.
- T. Whitley, A. Tomiczek, C. Tripp, A. Ortega, M. Mennu, J. Bridge, P.G. Ifju, "Design of a Small Unmanned Aircraft System for Bridge Inspections," Journal of Sensors, vol 20, issue 18, 2020.
- J.T. Cantrell, S. Rohde, D. Damiani, R. Gurnani, L DiSandro, J. Anton, A, Young, A Jerez, D. Steinbach, C. Kroese, P.G. Ifju, "Experimental Characterization of the Mechanical Properties of 3D-Printed ABS and Polycarbonate Parts," Journal of Rapid Prototyping, Vol 23 Issue 4, pp. 811-824, 2017.
- T.J. Mueller, J.C. Kellogg, P.G. Ifju, S. Shkarayev, "Introduction to the Design of Fixed-Wing Micro Aerial Vehicles," AIAA education series, AIAA, Reston, VA, 2007.
- D. Post, B. Han and P. G. Ifju, "High Sensitivity Moiré: Experimental Analysis for Mechanics and Materials," Mechanical Engineering Series, Springer-Verlag, New York, NY, 1994.

KEY AWARDS

- SEM Murray Medal (2022)
- Mandels Prize from the International Hydrofoil Society (2020),
- SEM Charles E. Taylor Award (2018)
- SEM Zandman Award (2016)
- SEM Fellow (2015)
- ICCES Albert Kobayashi Award (2013)
- Experimental Techniques Paper of the Year (Harding Award, 2011, 1993),
- AIAA Abe Zarem Award (2005)
- SEM J. Durelli Award (2004)
- Experimental Mechanics Paper of the Year (Peterson Award, 2004)
- SAMPE Journal Paper of the Year (2001)
- NSF CAREER Award (1995-1998)
- MAE Excellence Term Professorship (2021-2024)
- Excellence in Innovation Award (2021)
- UF Term Professorship (2018-2021),
- MAE Teacher of the Year (2015-2016, 1997-1998),
- Knox Millsaps Term Professorship (2012-2015)
- AIAA Outstanding Professor (2007-2008)
- UF Teacher Incentive Program (TIP Award, 1998)
- Tau Beta Pi, College of Engineering Teacher of the Year (1996-1997)

FELLOW OF THE SOCIETY FOR EXPERIMENTAL MECHANICS (SEM)

EDUCATION

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NAM-HO KIM

PROFESSOR

KEYWORDS

Design under uncertainty, nonlinear computational mechanics, structural health monitoring and prognostics, verification validation and uncertainty quantification

OVERVIEW

Professor Kim's research is focused on uncertainty quantification of scientific computation and design. This research branches out into three different engineering applications. (1) Design under uncertainty: when various sources of uncertainty are present, we try to take care of uncertainty either by compensating for it or by reducing it. (2) Prognostics and health management: The future health state of a system is predicted using measured data during operation and the remaining useful life is predicted with uncertainty. (3) Verification, validation and uncertainty quantification: in scientific computing, various sources of uncertainty are quantified in validating prediction accuracy. In particular, we focus on how experiments contribute to reducing model-form uncertainty.

SELECTED PUBLICATIONS

- S. Kim, J.-H. Choi, and N.H. Kim Data-driven prognostics with low-fidelity physical information for digital twin: physics-informed neural network, Structural and Multidisciplinary Optimization 65, Article 255, 2022.
- N.H. Kim, T. Dong, D. Weinberg, and J. Dalidd, Generalized optimality criteria method for topology optimization, Applied Sciences 11, Article 3175, 2021.
- S. Bae, C. Park, and N.H. Kim, Estimating effect of additional sample on uncertainty reduction in reliability analysis using Gaussian process, Journal of Mechanical Design 142(11), Article 111706, 2020.
- Y. Zhang, N.H. Kim, C. Park and R.T. Haftka, Multi-fidelity surrogate based on single linear regression, AIAA Journal 56(12), pp. 4944-4952, 2018.
- M. Giselle Fernández-Godino, C. Park, N.H. Kim and R.T. Haftka, Issues in deciding whether to use multifidelity surrogates, AIAA Journal 57(5), pp. 2039-2054, 2019.

KEY AWARDS

- 2022 Best teaching award, UF MAE Department
- 2020 Best paper award, Prognostics and Health Management Conference
- 2017 International Educator Award, UF
- 2017 Executive Committee, International Society of Structural and Multidisciplinary Optimization
- 2015 Daniel C. Drucker Faculty Fellow, UF MAE Department
- 2012 Design and research award, Biomedical Engineering Society, 2012 Best paper award, Computational Structural Engineering Institute
- 2011 Associate Fellow, AIAA
- 1994 Silver Medal Prize, Agency for Defense Development

AIAA ASSOCIATE FELLOW

EDUCATION

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ASHOK KUMAR

ASSOCIATE PROFESSOR

KEYWORDS

Finite Element Method, Immersed Boundary Finite Element Method, Topology Optimization, Geometric and Solid modeling, Rapid Prototyping

OVERVIEW

Professor Kumar's research for the last decade has focused on Immersed boundary FEM which is a mesh independent way of performing finite element analysis where the geometry is immersed in a background mesh to perform the analysis. This approach eliminates the difficulty of generating a mesh that fits the geometry. Another line of research has been on topology optimization including B-spline based approach and development an approach for stress constrained optimization. A recent topic of research has been the study of ignition in energetic materials due to impact using thermo-plastic simulations carried out on traditional large deformation finite element analysis software. Past research includes research on rapid prototyping using electrophotographic layered manufacturing approach.

SELECTED PUBLICATIONS

- O. Yakaboski, A. V. Kumar, Modeling and Simulation of RDX Powder Thermo-Mechanical Response to Drop Impact, Propellants, Explos. Pyrotech. (2021) prep.202000336. https://doi.org/10.1002/prep.202000336
- D. Hoover, A. V. Kumar, Immersed boundary thin shell analysis using 3D B-Spline background mesh, Finite Elem. Anal. Des. 195 (2021) 103574. https://doi.org/10.1016/j.finel.2021.103574
- Menon, S. and Kumar A. V., 2020, "Isoparametric B-spline Elements for Immersed Boundary Explicit Dynamic Simulation", Journal of Computing and Information Science in Engineering, Vol. 20(4), pp. 041010-1- 041010-12. DOI: 10.1115/1.4046338.
- Kumar, A. V., 2020, "Survey of Immersed Boundary Approaches for Finite Element Analysis", Journal of Computing and Information Science in Engineering, 20(4): 041003-1-041003- 13. DOI: 10.1115/1.4045054
- Kumar, A. V., 2019, "Conceptual Design of Structures Using an Upper Bound of von Mises Stress", Journal of Computing and Information Science in Engineering, 19, pp. 011005-(13 pages) DOI: 10.1115/1.4041705
- Kumar, Ashok V. and Dutta Anirban, 2004, "Electrophotographic Layered Manufacturing", Journal of Manufacturing Science and Engineering, Transactions of the ASME, Vol. 126, Issue 3, pp. 571-576.

KEY AWARDS

- ASME CIE distinguished service award
- NSF CAREER award, 2000
- Navy Young Investigators award, 1999

EDUCATION

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Massachusetts Institute of Technology

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RICHARD LIND

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KEYWORDS

aeroservoelasticity, morphing, controls, flight testing

SELECTED PUBLICATIONS

- Lind, R. (2012). Robust Aeroservoelastic Stability Analysis: Flight test applications. Springer.
- Wilcox, Z. D., MacKunis, W., Bhat, S., Lind, R., & Dixon, W. E. (2010). Lyapunov-based exponential tracking control of a hypersonic aircraft with Aerothermoelastic effects. Journal of Guidance, Control, and Dynamics, 33(4), 1213–1224. https://doi.org/10.2514/1.46785
- Lind, R. (1999). Linear parameter-varying modeling and control of structural dynamics with aerothermoelastic effects. 40th Structures, Structural Dynamics, and Materials Conference and Exhibit. https://doi.org/10.2514/6.1999-1393
- Garcia, H., Abdulrahim, M., & Lind, R. (2003). Roll control for a Micro Air Vehicle Using Active Wing Morphing. AIAA Guidance, Navigation, and Control Conference and Exhibit. https://doi.org/10.2514/6.2003-5347
- Abdulrahim, M., Garcia, H., & Lind, R. (2005). Flight characteristics of shaping the membrane wing of a Micro Air Vehicle. Journal of Aircraft, 42(1), 131–137. https://doi.org/10.2514/1.4782
- Webb, T., Prazenica, R., Kurdila, A., & Lind, R. (2004). Vision-based state estimation for autonomous micro-air vehicles. AIAA Guidance, Navigation, and Control Conference and Exhibit. https://doi.org/10.2514/6.2004-5349

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RENWEI MEI

PROFESSOR

KEY WORDS

Two-phase flow, turbulence, computational fluid mechanics

SELECTED PUBLICATIONS

- Rhodes, N. R., Barde, A., Randhir, K., Li, L., Hahn, D. W., Mei, R., ... & AuYeung, N. (2015). Solar thermochemical energy storage through carbonation cycles of SrCO3/SrO supported on SrZrO3. ChemSusChem, 8(22), 3793-3798.
- Mei, R., Shyy, W., Yu, D., & Luo, L. S. (2000). Lattice Boltzmann method for 3-D flows with curved boundary. Journal of Computational Physics, 161(2), 680-699.
- Yu, D., Mei, R., & Shyy, W. (2002). A multi-block lattice Boltzmann method for viscous fluid flows. International journal for numerical methods in fluids, 39(2), 99-120.
- Mei, R., Luo, L. S., & Shyy, W. (1999). An accurate curved boundary treatment in the lattice Boltzmann method. Journal of computational physics, 155(2), 307-330.
- Mei, R., Shang, H., Klausner, J. F., & Kallman, E. (1997). A contact model for the effect of particle coating on improving the flowability of cohesive powders. KONA Powder and Particle Journal, 15, 132-141.
- Yu, D., Mei, R., Luo, L. S., & Shyy, W. (2003). Viscous flow computations with the method of lattice Boltzmann equation. Progress in Aerospace sciences, 39(5), 329-367.

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AMOR MENEZES

ASSISTANT PROFESSOR

KEYWORDS

Biological Control, Systems Biology, Synthetic Biology, Space Systems

OVERVIEW

Professor Menezes leads the SYBORGS Lab (SYstems / SYnthetic Biological Optimization, Regulation, or Generation Systems Laboratory), a multidisciplinary team that models and controls biological processes. His group engineers mammalian, bacterial, and plant systems for medical and space applications. His lab has both experimental (wet) and computational (dry) lab capabilities. Research emphases include: (1) the use of feedback control to manipulate the concentrations of proteins that are involved in inflammation-mediated coagulation disorders; (2) the design of biomanufacturing processes and systems for Mars deployment, because synthetic biology is a useful payload minimization approach for long-duration space missions; and (3) the engineering of microbes and plants to reject an extreme and harsh environment for increased sustainability.

SELECTED PUBLICATIONS

- Berliner AJ, Lipsky I, Ho D, Hilzinger JM, et al. Space bioprocess engineering on the horizon. Communications Engineering. 2022 Jun 21;1:13.
- Ghetmiri DE, Menezes AA. Nonlinear dynamic modeling and model predictive control of thrombin generation to treat trauma-induced coagulopathy. International Journal of Robust and Nonlinear Control. 2022 Jan 5: rnc.5963.
- Ghetmiri DE, Cohen MJ, Menezes AA. Personalized modulation of coagulation factors using a thrombin dynamics model to treat trauma-induced coagulopathy. npj Systems Biology and Applications. 2021 Dec 7;7:44.
- Berliner AJ, Hilzinger JM, Abel AJ, McNulty MJ, et al. Towards a biomanufactory on Mars. Frontiers in Astronomy and Space Sciences. 2021 Jul;8:711550.
- Menezes AA, Vilardi RF, Arkin AP, Cohen MJ, Targeted clinical control of trauma patient coagulation through a thrombin dynamics model. Science Translational Medicine. 2017 Jan 4;9(371):eaaf5045.

KEY AWARDS

- 2019: Anderson Scholar Faculty Honoree, University of Florida
- 2015: Emerging Leader in Biosecurity, University of Pittsburgh Medical Center's Center for Health Security
- 2015: Fellow, Synthetic Biology Leadership Excellence Accelerator Program
- 2011: Policy Leader (top 50/1200), Public Service of Canada

AIAA, ASME, ASGSR, AND BMES MEMBER IEEE SENIOR MEMBER

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STEVE A.E. MILLER

ASSOCIATE PROFESSOR

KEYWORDS

Turbulence, Aeroacoustics, Theory, Numerics, Applied Math, CFD

OVERVIEW

Ast. Prof. Miller's research is focused on predicting turbulent flows and acoustic radiation using theory, analytical methods, modeling, and computational fluid dynamics. Application of these techniques have been applied to a wide range of flows including tornados, boundary layers, wakes, sonic boom, jets, hypersonic vehicles, and more. Agencies such as NASA, DARPA, the US Navy, and others offer support. The goal of these investigations is to ultimately understand the physics and mathematics of turbulent flows for the benefit of society. Dr. Miller was a Research Aerospace Engineer at NASA Langley for seven years before joining University of Florida. Research is conducted within the Theoretical Fluid Dynamics and Turbulence Group.

SELECTED PUBLICATIONS

- Shen, W., Patel, T. K., and Miller, S. A. E., "A Time Domain Approach for Shock Noise Prediction with Decomposition Analyses of Large-Scale Coherent Turbulent Structures in Jets," Journal of Sound and Vibration, Vol. 499, 2021.
- Miller, S. A. E., "Analytical Equations for Thermo-Acoustic Instability Sources and Acoustic Radiation from Reacting Turbulence," International Journal of Aerospace Engineering, 2020.
- Miller, S. A. E., "Analytical Solution of Heat Conduction from Turbulence with an Isotropic Example," Journal of Applied Mathematics, July, 2021.
- Miller, S. A. E., "Theoretical Aeroacoustics: Compiled Mathematical Derivations of Fereidoun 'Feri' Farassat," NASA TM 2016-219179, 2016, 1226 pages.
- Miller, S. A. E., "Toward a Nonlinear Acoustic Analogy: Turbulence as a Source of Sound and Nonlinear Propagation," NASA-TM-2015-218706, 2015

KEY AWARDS

- Defense Advanced Projects Research Agency (DARPA) Young Faculty Award for Analytical Prediction of Hypersonic Flow-Fields
- NASA Early Career Achievement Medal for Jet Theoretical Aeroacoustics
- Doug Ensor Award
- AIAA Hampton Roads Section Robert A. Mitcheltree Young Engineer of the Year Award
- AIAA Laurence J. Bement Young Professional Paper Award

EDUCATION

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SAEED MOGHADDAM

WILLIAM F. POWERS PROFESSOR

KEYWORDS

Heat Transfer, Interfacial Phenomena, Separation Science, Micro- and Nanomanufacturing

OVERVIEW

Professor Moghaddam's research is in the general areas of multi-scale transport, interfacial and separation sciences, and micro- and nanomanufacturing focused on addressing technological needs in energy, environment, and biomedical domains. His research team is currently focused on 1) development of next generation phase-change thermal management solutions for data centers, power electronics, and directed-energy weapons (DEWs); 2) energy efficiency, decarbonization, and sustainability in buildings and industrial and agricultural processes through development of alternative cooling/heating and dehumidification/drying processes; and 3) advancing rental replacement therapy through enhancement and miniaturization of dialysis process and equipment as well as alterative wearable solutions.

SELECTED PUBLICATIONS

- S. Sanadhya, Z. Tucker, E. Gulotty, E., W. Boggess, B. Ashfeld, and S. Moghaddam, "Thermodynamic Descriptors of Sensible Heat Driven Liquid-Liquid Phase Separation", Journal of Molecular Liquids, Article 119440, 2022.
- R. Rode, H. Chung, H. Miller, T. Gaborski, and S. Moghaddam, "Trilayer Interlinked Graphene Oxide Membrane for Wearable Hemodialyzer," Advanced Material Interfaces, vol. 8, 2001985, 2021.
- M. Matin and S. Moghaddam, "Thin Liquid Films Formation and Evaporation Mechanisms Around Elongated Bubbles in Rectangular Cross-section Microchannels," International Journal of Heat and Mass Transfer, vol. 163, 2020.
- D. Chugh, K. Gluesenkamp, A. Abu-Heiba, M. Alipanah, A. Fazeli, R. Rode, M. Schmid, V. Patel, and S. Moghaddam, "Experimental Evaluation of a Semi-open Membrane-based Absorption Heat Pump System using Ionic Liquids," Applied Energy, vol. 239, pp. 919-927, 2019.
- A. Fazeli and S. Moghaddam, "A New Paradigm for Understanding and Enhancing the Critical Heat Flux (CHF) Limit," Scientific Reports, vol. 7, art. 5184, 2017.

KEY AWARDS

- 2017 UF Herbert Wertheim College of Engineering (HWCOE) PhD advisor of the year
- 2016 UF technology innovator
- 2014 Khargonekar Award for the most accomplished Assistant Professor undergoing review for tenure and promotion
- 2014 ASME ICNMM Outstanding Early CAREER Award
- 2010 Guinness Book of World Records for development of the smallest fully functional fuel cell with on-board hydrogen generation.

EDUCATION

Ph.D. 2006
University of Maryland

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DR. KAMRAN MOHSENI

PROFESSOR

OVERVIEW

Professor Mohseni received his Ph.D. in 2000 from California Institute of Technology. After a year as a Postdoc in Control and Dynamical Systems at Caltech he joined the Aerospace Engineering Sciences department at the University of Colorado in Boulder as an Assistant Professor. Professor Mohseni joined the University of Florida as W. P. Bushnell Endowed Professor in MAE and ECE departments in 2011. Professor Mohseni is the director of Institute for Networked Autonomous Systems (INAS).

SELECTED PUBLICATIONS

- Mohseni, K., & Colonius, T. (2000). Numerical treatment of polar coordinate singularities. Journal of Computational Physics, 157(2), 787–795. https://doi.org/10.1006/jcph.1999.6382
- Allred, J., Hasan, A. B., Panichsakul, S., Pisano, W., Gray, P., Huang, J., Han, R., Lawrence, D., & Mohseni, K. (2007). Sensorflock. Proceedings of the 5th International Conference on Embedded Networked Sensor Systems. https://doi.org/10.1145/1322263.1322275
- Mohseni, K., & Gharib, M. (1998). A model for Universal Time Scale of Vortex Ring Formation. Physics of Fluids, 10(10), 2436–2438. https://doi.org/10.1063/1.869785
- Mohseni, K., Ran, H., & Colonius, T. (2001). Numerical experiments on Vortex Ring Formation. Journal of Fluid Mechanics, 430, 267–282. https://doi.org/10.1017/s0022112000003025
- Mohseni, K., Marsden, J., Kosovic, B., & Shkoller, S. (2001). Numerical simulations of the lagrangian averaged navier-stokes (lans-alpha) equations for forced homogeneous isotropic turbulence. 15th AIAA Computational Fluid Dynamics Conference. https://doi.org/10.2514/6.2001-2645
- Mohseni, K. (2006). Pulsatile Vortex Generators for low-speed maneuvering of small underwater vehicles. Ocean Engineering, 33(16), 2209–2223. https://doi.org/10.1016/j.oceaneng.2005.10.022

EDUCATION

Ph.D. 2000
California Institute of Technology

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PATRICK MUSGRAVE

ASSISTANT PROFESSOR

KEYWORDS

Fluid-Structure Interaction, Adaptive Structures, Bio-inspired Propulsion, Underwater Robotics

OVERVIEW

Dr. Musgrave's research focuses on adaptive and morphing systems operating in fluidic environments, with an emphasis on systems experiencing dynamic fluid-structure interactions. These systems are inherently multi-physical and sit at the intersection of structures, hydro/aerodynamics, mechatronics, smart materials, and controls. To investigate these systems, Dr. Musgrave's research uses a combination of experimentation and analytic/reduced-order modeling. Specific applications include bio-inspired underwater propulsion, underwater robotics, embedded sensing, and compliant aerospace systems.

SELECTED PUBLICATIONS

- Musgrave, Patrick F. "Electro-Hydro-Elastic Modeling of Structure-Borne Traveling Waves and Their Application to Aquatic Swimming Motions." Journal of Fluids and Structures 102 (2021): 103230.
- Musgrave, Patrick F, Mohammad I Albakri, and Austin A Phoenix. "Guidelines and Procedure for Tailoring High-Performance, Steady-State Traveling Waves for Propulsion and Solid-State Motion." Smart Materials and Structures 30, no. 2 (2021): 025013.
- Musgrave, Patrick F, Mohammad I Albakri, Charles Tenney, and Pablo A Tarazaga. "Generating and Tailoring Structure-Borne Traveling Waves on Two-Dimensional Surfaces." Journal of Sound and Vibration (2020): 115417.
- Musgrave, Patrick F, and Pablo A Tarazaga. "Turbulent Boundary Layer over a Piezoelectrically Excited Traveling Wave Surface." Paper presented at the AIAA Scitech 2019 Forum, 2019.

KEY AWARDS

- Jerome Karle's Fellowship, US Naval Research Laboratory (2018 - 2020)
- Horde Fellowship, Virginia Tech (2018)
- DAAD Study Scholarship, German Government (2012 – 2013)

EDUCATION

Ph.D. 2018
Virginia Tech

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SEAN R. NIEMI

ASSISTANT INSTRUCTIONAL PROFESSOR

KEYWORDS

Experiential Learning, Capstone Design Instruction, Engineering Design, CAD/CAM, Project Based Learning, Workforce Development

OVERVIEW

Dr. Niemi's research is focused on engineering design pedagogy and best practices for the instruction of large-enrollment project-based design courses. He utilizes his classroom and laboratory as a research tool to study group dynamics, hands on learning, and to develop new pedagogical methods including the integration of PDM software and enterprise communication tools for collaborative design. He is also actively designing new hands-on manufacturing courses for students and members of the local community to prepare them for careers in the burgeoning US manufacturing industry.

SELECTED PUBLICATIONS

- K. Basinger, B. Elgan, S. R. Niemi. "Continuous Improvement of an Experiential Learning Manufacturing Lab Course". 2022 ASEE Annual Conference & Exposition, Minneapolis, MN, 2022, August.
- L. E. Rogers, K. J. Stubbs, N. A. Thomas, S. R. Niemi, A. Rubiano, M. J. Traum. "Transitioning Oral Presentations Online in Large-Enrollment Capstone Design Courses Increases Panelist Participation," Advances in Engineering Education, Vol. 8, No. 4, Fall 2020.
- M. J. Traum, S. R. Niemi, M. W. Griffis, N. A. Thomas, W. G. Sawyer. Implementing an Effective Large-Enrollment Engineering Capstone Design-and-Build Program. Proceedings of the 2020 American Society of Engineering Education Southeastern Section Conference, 2020

KEY AWARDS

- 2021 MAE Teacher of the Year

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JING PAN

ASSISTANT PROFESSOR

KEYWORDS

Biosensor, Medical Technology, Nanotechnology

OVERVIEW

Dr. Pan's research is focused on the development of functional nanomaterials and biomolecules for medical and biotechnological applications. His lab develops molecular tools, advanced optical microscopy, medical and bioanalytical instruments to study and engineer biological systems at different scales. The outcomes of his research are translational to applications in disease diagnostics, biomolecular sensors, novel therapeutics, environmental monitoring and bio-manufacturing. His currently research projects focus on developing directed evolution approach for functional bio-nano hybrid materials, developing bioanalytical platforms for plant synthetic biology and building prototype instruments for bedside patient monitoring in hospital intensive care units.

SELECTED PUBLICATIONS

- Poudineh, M.; Maikawa, C. L.; Ma, E. Y.; Pan, J.; Mamerow, D.; Hang, Y.; Baker, S. W.; Beirami, A.; Yoshikawa, A.; Eisenstein, M.; Kim, S.; Vuckovic, J.; Appel, E. A.; Soh, H. T. A Fluorescence Sandwich Immunoassay for the Real-Time Continuous Detection of Glucose and Insulin in Live Animals. Nature Biomedical Engineering 2021, 5 (1), 53–63.
- Zhang, Z.; Wang, X.; Wei, X.; Zheng, S. W.; Lenhart, B. J.; Xu, P.; Li, J.; Pan, J.; Albrecht, H.; Liu, C. Multiplex Quantitative Detection of SARS-CoV-2 Specific IgG and IgM Antibodies Based on DNA-Assisted Nanopore Sensing. Biosensors & Bioelectronics 2021, 181, 113134.
- Pan, J.; Du, Y. C.; Qiu, H. M.; Upton, L. R.; Li, F. R.; Choi, J. H. Mimicking Chemotactic Cell Migration with DNA Programmable Synthetic Vesicles. Nano Letters 2019, 19 (12), 9138–9144.
- Pan, J.; Cha, T. G.; Li, F. R.; Chen, H. R.; Bragg, N. A.; Choi, J. H. Visible/near-Infrared Subdiffraction Imaging Reveals the Stochastic Nature of DNA Walkers. Science Advances 2017, 3 (1), e1601600.
- Cha, T. G.; Pan, J.; Chen, H. R.; Salgado, J.; Li, X.; Mao, C. D.; Choi, J. H. A Synthetic DNA Motor That Transports Nanoparticles along Carbon Nanotubes. Nature Nanotechnology 2014, 9 (1), 39–43.
- Pan, J.; Zhang, H. Y.; Cha, T. G.; Chen, H. R.; Choi, J. H. Multiplexed Optical Detection of Plasma Porphyrins Using DNA Aptamer-Functionalized Carbon Nanotubes. Analytical Chemistry 2013, 85 (17), 8391–8396.

EDUCATION

Ph.D. 2017
Purdue University

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UMESH PERSAD

ASSOCIATE INSTRUCTIONAL PROFESSOR

KEYWORDS

Engineering Design, Product Development, Artificial Intelligence, Biomedical, Design Education

OVERVIEW

Dr. Persad's research is focused on Artificial Intelligence (AI) applied in two areas: (1) Computer Aided Design (CAD) tools for biomedical product design (especially for low resource settings) and (2) Software tools for Engineering Design Education to enable better learning outcomes at scale including blended learning, intelligent tutoring, and automated evaluation.

SELECTED PUBLICATIONS

- U. Persad, M. Mencia, "The value of 3D Printing in Orthopaedics," Caribbean Medical Journal (online), (2020).
- U. Persad , J. Goodman-Deane , P. M. Langdon , P. J. Clarkson "Exploring User Capability Data with Topological Data Analysis," Breaking Down Barriers, Springer, pp. 41–50 (2018).
- U. Persad, K. Athre, "Experiences With Teaching Introductory Engineering Product Design," The West Indian Journal of Engineering, Vol. 36, No. 1, pp. 66-78 (2013)
- P. Langdon, U. Persad, P. J. Clarkson, "Developing a model of cognitive interaction for analytical inclusive design evaluation," Interacting with Computers, Special Issue on Inclusion and Interaction: Designing Interaction for Inclusive Populations, Vol. 22, No. 6, pp. 510-529 (2010).
- U. Persad, P. M. Langdon, P. J. Clarkson, "Characterising user capabilities to support inclusive design evaluation," Universal Access in the Information Society (UAIS), Vol. 6, No. 2, pp. 119-135 (2007).

KEY AWARDS

- 2014 Employee Excellence in promoting the UTT Entrepreneurial Spirit Award from The University of Trinidad and Tobago (UTT).
- 2010 '100 Quick Wins Award' Presented by the University of Trinidad and Tobago (UTT) as part of its quality improvement initiative.

EDUCATION

Ph.D. 2012
Cambridge University

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ALICIA PETERSEN

ASSISTANT PROFESSOR

KEYWORDS

Space Weather; Space Physics; Heliophysics; Space Weather Impacts; Space Weather Forecasting; Space Weather Drivers; Space Environment; Space Weather Modelling; Spacecraft; Satellites; In Situ Observations; Data Analysis; Machine Learning; Dynamics; Magnetohydrodynamics (MHD); Data-Model Comparison

OVERVIEW

Dr. Alicia K. Petersen researches the kinetic physics, magnetism and dynamics at play during the transit and interaction of space weather phenomena in the inner solar system, their impacts on spacecraft, and strategies for mitigating the impacts of space weather.

Space weather events have damaging effects on spacecraft, communications, GPS, air transportation, and power systems. Space weather is caused by phenomena which originate at the Sun and propagate through the inner solar system before reaching Earth. This region is dominated by the Sun's heliospheric magnetic field, which is both shaped by and shapes the propagation of ionized plasma and particles throughout the solar system. This includes explosive eruptions of plasma known as coronal mass ejections (CMEs) and energetic particles known as solar energetic particles (SEPs).

SELECTED PUBLICATIONS

- Dearing, T., Hauser, J., Xudong, C., Petersen, C., and Nicotra, M., "PRONTO:An Efficient Trajectory Optimization Technique for Constrained Spacecraft Attitude Maneuvers." Journal of Guidance, Control, and Dynamics, AIAA, 2021
- Lu, P., Lewis, A., Adams, R., DeVore, M., and Petersen C., "Finite-Thrust Natural-Motion Circumnavigation Injection by Convex Optimization" Journal of Guidance, Control, and Dynamics, AIAA, 2021

EDUCATION

Ph.D. 2020
University of Michigan

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CHRIS "CHRISPY" PETERSEN

ASSISTANT PROFESSOR

KEYWORDS

Spacecraft; Satellites; Guidance, Navigation, Control, and Autonomy (GNCA); Dynamics; Optimization; Real-time; Computationally Aware Optimization; Human-Satellite Interfaces Rendezvous, Proximity Operations, and Docking (RPOD); eXtra GEostationary Orbit (XGEO)

OVERVIEW

Dr. Chrispy Petersen looks at four research pillars that cross theory and application including exploring and exploiting spacecraft dynamics, advanced guidance, navigation, control and autonomy (GNCA), real-time computationally aware optimization for spacecraft, and immersive human-satellite interfaces. He is interested in all four pillars for space applications, but primarily focuses on two domains: i) Rendezvous, Proximity Operations, and Docking (RPO), where two or more satellites fly within 500 km of one another, and ii.) eXtra Geostationary Orbit (XGEO) operations, where satellites fly past the Earth, the Moon, and beyond. He enjoys a healthy balance between theory and application in order to improve state-of-the-art space technology. At UF Dr. Petersen's lab, the Spacecraft Technology and Research (STAR) Lab, is developing, designing, and deploying methods for satellites.

SELECTED PUBLICATIONS

- Dearing, T., Hauser, J., Xudong, C., Petersen, C., and Nicotra, M., "PRONTO:An Efficient Trajectory Optimization Technique for Constrained Spacecraft Attitude Maneuvers." Journal of Guidance, Control, and Dynamics, AIAA, 2021
- Lu, P., Lewis, A., Adams, R., DeVore, M., and Petersen C., "Finite-Thrust Natural-Motion Circumnavigation Injection by Convex Optimization" Journal of Guidance, Control, and Dynamics, AIAA, 2021
- Phillips, S., Petersen, C., and Fierro, R., "Robust, Resilient, and Energy Efficient Satellite Formation Control," Intelligent Control and Smart Energy Management: Renewable Resources and Transportation, Springer Book, 2021.
- Petersen, C., Phillips S., Hobbs, K., Lang, L., "Challenge Problem: Assured Satellite Proximity Operations," Proceedings of the Spaceflight Mechanics Meeting, AAS/AIAA, 2021.
- Petersen, C., Leve, F., and Kolmanovsky, I., "Model Predictive Control of an Underactuated Spacecraft with Two Reaction Wheels." Journal of Guidance, Control, and Dynamics, AIAA, 2017
- Petersen, C., Leve, F., Flynn, M., and Kolmanovsky, I., "Recovering Linear Controllability of an Underactuated Spacecraft by Exploiting Solar Radiation Pressure." Journal of Guidance, Control, and Dynamics, AIAA, 2016

KEY AWARDS

- 2021 AFRL Early Career Award; 2021 AFRL Science, Technology, Engineering, and Mathematics (STEM) Engineering Achievement Award
- 2020 AFRL/RV Rotary National Aware for Space Achievement (RNASA) Team Award (EAGLE/Mycroft)
- 2020 AFRL STEM Exploratory Or Advanced Tech Development Team Award (EAGLE/Mycroft)
- 2019 AFRL Annual Award Commander's Cup Team Award (EAGLE/Mycroft)

EDUCATION

Ph.D. 2016
University of Michigan

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DR. WINFRED M. PHILLIPS

PROFESSOR

KEYWORDS

Fluid mechanics, gas dynamics, biomedical engineering

OVERVIEW

Research interests include experiment and mathematical modelling in fluid mechanics. Issues in space reentry, hypersonics and transition regime in gas dynamics. Studies in hemodynamics and blood rheology. Medical devices with emphasis on the design of artificial hearts.

SELECTED PUBLICATIONS

- "Transition Regime Sphere Drag Near the Free Molecular Limit," by Phillips, W. M. and A. R. Kuhlthau, AIAA Journal, Vol. 9, No. 7, pp. 1434-1435, [July 1971].
- "Artificial Heart Evaluation Using Flow Visualization Techniques," by Phillips, W. M., J. Brighton, and W. S. Pierce, Transactions, The American Society for Artificial Internal Organs, pp. 194-201, [1972].
- "Toward a Constitutive Equation for Blood," by Phillips, W. M. and S. Deutsch, Biorheology, Vol. 12, Pergamon Press, pp. 383-389, [October 1975].
- "Viscometric Techniques and the Rheology of Blood," Blood Cells, Springer International, Heidelberg, pp. 101-111, [1977].
- "Red Blood Cell Deformability and Hemolytic Anemias," by Mohandas, N., W. M. Phillips, and M. Bessis, Seminars in Hematology 16(2), pp. 95-114, [April 1979].
- "Design Criteria and Evaluation of a Sac Artificial Heart," Advances in Cardiovascular Physics, Vol. 5, Part IV, Prostheses, Assist and Artificial Organs, Karger, Basel, pp. 184-215, [1983].
- "The Fluid Mechanics of Artificial Hearts," Artificial Heart: The Development of Biomation in the 21st Century, W. B. Saunders, pp. 75-80, [1992].

KEY AWARDS

- Florida Trend – Florida 500 2020, Florida's Most Influential Business Leaders, Living Legends, [2020].
- Legacy Award, Gainesville Area Chamber of Commerce, [2014].
- ASME Honorary Membership, [2009].
- Fellow, Biomedical Engineering Society, [2005].
- ASEE Benjamin Garver Lamme Award, [2003].
- AAES National Engineering Award, [1999].
- Fellow, American Institute for Aeronautics and Astronautics, [1998].
- Fellow, New York Academy of Sciences, [1995].
- Fellow, Accreditation Board for Engineering and Technology, Inc., [1993].
- Fellow, American Astronautical Society, [1993].
- Fellow, American Institute for Medical and Biological Engineering, [1992].
- Council of the Sagamores of the Wabash, Governor's Award - Indiana, [1988].
- Fellow, American Society for Engineering Education, [1987].
- Fellow, Royal Society for Arts (England), [1987].
- Fellow, American Society of Mechanical Engineers, [1984].
- Fellow, American Association for the Advancement of Science, [1982].
- Research Career Development Award, U.S. Public Health Service, [1975 1980] - [5 years full salary support for research].
- UF Win Phillips Town Gown Relations Award, [2022].

EDUCATION

D.Sc., 1968, University of Virginia

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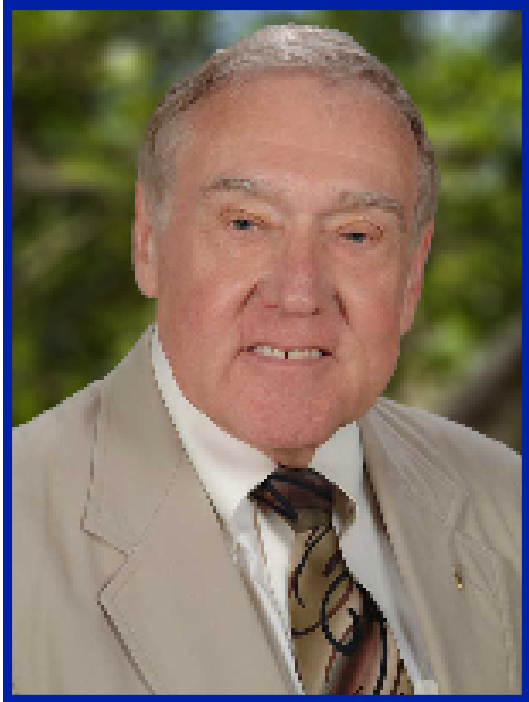

ANIL V. RAO

UNIVERSITY TERM PROFESSOR

KEYWORDS

Optimal space mission design and control, atmospheric flight performance optimization and control, computational methods for optimal control, guidance and control of aerospace vehicles, performance optimization of ground and underwater vehicles

OVERVIEW

Professor Rao's research interests lie in the area of control and optimization of space and air vehicles and combine the development of new computational methods for optimal control with novel applications including space mission planning, performance optimization of atmospheric flight vehicles, and other vehicular control problems (for example, high performance ground and underwater vehicles).

SELECTED PUBLICATIONS

- ·Patterson, M. A. and Rao, A. V., "GPOPS-II: A MATLAB Software for Solving Multiple-Phase Optimal Control Problems Using hp-Adaptive Gaussian Quadrature Collocation Methods and Sparse Nonlinear Programming," ACM Transactions on Mathematical Software, Vol. 41, No. 1, October 2014, Article 1, pp. 1:1— 1:37.
- ·Weinstein, M. J. and Rao, A. V., "Algorithm 984: ADiGator, a Toolbox for the Algorithmic Differentiation of Mathematical Functions in MATLAB Using Source Transformation via Operator Overloading," ACM Transactions on Mathematical Software, Vol. 44, No. 2, Article 21, October 2017, pp. 21:1 — 21:25.
- ·Garg, D., Patterson, M. A., Hager, W. W., Rao, A. V., Benson, D. A., and Huntington, G. T., "A Unified Framework for the Numerical Solution of Optimal Control Problems Using Pseudospectral Methods," Automatica, Vol. 46, No. 11, November 2010, pp. 1843 — 1851.
- ·Pager, E. R. and Rao, A. V., "Method for Solving Bang-Bang and Singular Optimal Control Problems using Adaptive Radau Collocation," Computational Optimization and Applications, Vol. 81, No. 3, April 2022, pp. 857—887.

KEY AWARDS

- Fellow of the American Astronautical Society — 2020

EDUCATION

Ph.D. 1996
Princeton University

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DR. BENOIT REVIL-BAUDARD

RESEARCH ASSISTANT SCIENTIST

KEYWORDS

Applied elasticity, Continuum Mechanics, Solid Mechanics, Plasticity, Finite Element Analysis, Computational Plasticity, Metal Forming, High-rate deformation of metallic materials, Damage Mechanics

SELECTED PUBLICATIONS

- Knezevic, M., Lebensohn, R. A., Cazacu, O., Revil-Baudard, B., Proust, G., Vogel, S. C., & Nixon, M. E. (2013). Modeling bending of α-titanium with embedded polycrystal plasticity in implicit finite elements. Materials Science and Engineering: A, 564, 116-126.
- Chandola, N., Lebensohn, R. A., Cazacu, O., Revil-Baudard, B., Mishra, R. K., & Barlat, F. (2015). Combined effects of anisotropy and tension–compression asymmetry on the torsional response of AZ31 Mg. International Journal of Solids and Structures, 58, 190-200.
- Cazacu, O., Revil-Baudard, B., & Chandola, N. (2019). Plasticity-damage couplings: from single crystal to polycrystalline materials. New York, NY, USA:: Springer International Publishing.
- Cazacu, O., Revil-Baudard, B., Lebensohn, R. A., & Gărăjeu, M. (2013). On the combined effect of pressure and third invariant on yielding of porous solids with von Mises matrix. Journal of Applied Mechanics, 80(6).
- Revil-Baudard, B., Cazacu, O., Flater, P., & Kleiser, G. (2015). Plastic deformation of high-purity α-titanium: Model development and validation using the Taylor cylinder impact test. Mechanics of Materials, 80, 264-275.
- Cazacu, O., Revil-Baudard, B., Chandola, N., & Kondo, D. (2014). New analytical criterion for porous solids with Tresca matrix under axisymmetric loadings. International Journal of Solids and Structures, 51(3-4), 861-874.

EDUCATION

PhD, 2010, Ecole Nationale Supérieure des Mines de Paris

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SHANNON RIDGEWAY

INSTRUCTIONAL ASSISTANT PROFESSOR

KEYWORDS

OVERVIEW

SELECTED PUBLICATIONS

KEY AWARDS

EDUCATION

Ph.D., 2011, University of Florida

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SUBRATA ROY

PROFESSOR

KEYWORDS

Active Flow Control, Hypersonics, Electric Propulsion, Machine Learning

OVERVIEW

Professor Roy designs and experiments with flow effectors for all flow regimes using gas discharge plasmas. He is the founding Director of the Applied Physics Research Group of the University of Florida. He and his team have been developing a modal finite element based in-house multiscale ionized gas (MIG) flow code for studying a broad class of multiscale and multiphysics problems including hypersonic nonequilibrium, micro-nanoscale flows, electrophoretic transport, plasma actuated fluid flow and heat transfer. He serves as a member of the Editorial Boards of Nature Scientific Reports, and Actuators, an Associate Editor of Frontiers in Physics, Modern Plasma Medicine, and the Journal of Fluid Flow, Heat and Mass Transfer. Professor Roy is also a nation appointed member of US delegation to a NATO Science and Technology Organisation working group on plasma actuator technologies.

SELECTED PUBLICATIONS

- A.D. Gupta, and S. Roy, "Modification of energetic modes for transitional flow control," AIP Advances (Featured Publication) 12, 035149 (2022).
- B. Choudhury, S. Portugal, S. Roy, et al., "Smart Dielectric Barrier Discharge Plasma decontamination: Spatially Targeted Decontamination with Actuated Ozone Distribution," Frontiers in Physics, 10:834030 (2022).
- T. Houba, A. Dasgupta, R. Gosse and S. Roy. "Supersonic turbulent flow simulation using a scalable parallel modal discontinuous Galerkin numerical method," Sci Reports, 9:14442 (2019).
- J. Xie, Q. Chen, P. Suresh, S. Roy, J. F. White, and A. D. Mazzeo, "Paper-based plasma sanitizers," Proc Natl Academy Sci, 114(20) 5119–5124 (2017).
- S. Roy, R. Raju, H.F. Chuang, B. Cruden and M. Meyyappan, 2003, "Modeling of gas flow through microchannels and nanopores," Journal of Applied Physics, 93 (9) 4870-4879.
- J. Blandino, N. Gatsonis, M. Cappelli, A. Gallimore, I. Boyd, N. Fisch, E. Choueiri, S. Roy, "Overview of Electric Propulsion Research in U.S. Academia," AIAA-2003-4442, Joint Propulsion Conference, AL.

KEY AWARDS

- Inducted Fellow of the National Academy of Inventors.
- Distinguished Visiting Fellow of Royal Academy of Engineering.

NATIONAL ACADEMY OF INVENTORS (NAI) FELLOW, ASME, RAES, DISTINGUISHED VISITING FELLOW OF ROYAL ACADEMY OF ENGINEERING

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DR. ANDRES RUBIANO

INSTRUCTIONAL ASSISTANT PROFESSOR

KEYWORDS

Fluid Mechanics, Heat Transfer, Mechanics of Materials, Statics, Dynamics, Thermodynamics, CAD, and Mech Design. Particular interest in Combustion, Renewable Energy, and Biology for Engineers, Microphysiological systems, tissue engineering, biomechanics, organs-on-a-chip, mechanobiology, renewable energy systems, gasification, and regenerative medicine.

OVERVIEW

Andrés Rubiano (PhD, University of Florida; MSc, Universidad de los Andes) is an Instructional Assistant Professor in the Department of Mechanical and Aerospace Engineering at the University of Florida. He currently teaches Mechanical Engineering Design 1 and 3 (Capstone Design). He has over 12 years of combined experience in teaching high school Physics and Calculus, GRE and GMAT prep courses (Quantitative Reasoning sections), and mechanical engineering undergraduate and graduate courses, including Advanced Heat Transfer, Combustion, Computer Aided Design, Mechanics of Materials, Fluid Mechanics, and Mech Design.

Dr. Rubiano's non-academic work experience includes the patient-specific, biocompatible and structural integrity design of cardiovascular occluders, thermal-structure Finite Element Analysis for blow-molded High-Density Polyethylene seats, countercurrent fixed-bed gasification of biomass (palm tree and coffee husk), motion-capture-based biomechanics studies for robotics applications, and most recently, heart and liver microphysiological systems (organs-on-a-chip) at the U.S. Food and Drug Administration (FDA).

SELECTED PUBLICATIONS

- Characterizing the reproducibility in using a liver microphysiological system for assaying drug toxicity, metabolism, and accumulation
A Rubiano, A Indapurkar, R Yokosawa, A Miedzik, B Rosenzweig, ...
Clinical and translational science 14 (3), 1049-1061
- Mechanical characterization by mesoscale indentation: advantages and pitfalls for tissue and scaffolds A Rubiano, C Galitz, CS Simmons
Tissue Engineering Part C: Methods 25 (10), 619-629
- Transitioning Oral Presentations Online in Large-Enrollment Capstone
- Design Courses Increases Panelist Participation.
LE Rogers, KJ Stubbs, NA Thomas, SR Niemi, A Rubiano, MJ Traum
Advances in Engineering Education 8 (4), n4
- Tunable methacrylated hyaluronic acid-based hydrogels as scaffolds for soft tissue engineering applications
BS Spearman, NK Agrawal, A Rubiano, CS Simmons, S Mobini, ...
Journal of Biomedical Materials Research Part A 108 (2), 279-291

KEY AWARDS

- UF Excellence in Teaching Innovation Award 2021

EDUCATION

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BHAVANI V. SANKAR

PROFESSOR

KEYWORDS

Composite materials and structures, micromechanics, stiffness and strength of textile composites.

OVERVIEW

Professor Sankar's research is focused on development of methods for efficient analysis of composite materials and structures. In particular, he is interested in micromechanical methods for stiffness and strength prediction of heterogeneous media such as fiber reinforced composites, textile composites, e.g., woven and braided composites, and cellular materials, e.g., open-cell foams, lattice structures. His group is interested in developing both simple but approximate analytical methods and detailed finite element analysis-based micromechanics. Application of Direct Micromechanics (DMM) for developing failure envelopes for various composites is of significant interest to Sankar's group.

SELECTED PUBLICATIONS

- Hemanth Thandaga Nagaraju, BV Sankar, G Subhash, NH Kim, RT Haftka,
- Effect of curvature on extensional stiffness matrix of 2-D braided composite tubes, Composites: Part A, 147 (2021) 106422 (10pp). AK Jonnalagadda, AS Sawant, SR Rohde, BV Sankar, PG Ifju, An analytical model for composite tubes with bend-twist coupling Composite Structures, 131 (2015) 578-584.
- SE Rohde, PG Ifju, BV Sankar, DA Jenkins, Experimental Testing of Bend-Twist Coupled Composite Shafts, Experimental Mechanics, (2015) 55:1613-1625.
- S Banerjee, BV Sankar, Mechanical properties of hybrid composites using finite element method-based micromechanics, Composites: Part B: Engineering 58 (2014) 318-327.
- Yalamanchili VK, BV Sankar, Indentation of Functionally Graded Beams and Its Application to Low-Velocity Impact Response, Composites Science and Technology 72 (2012) 1989-1994.
- Introduction to Finite Element Analysis and Design, 2nd Edition, Nam Ho Kim, Bhavani V. Sankar and Ashok V. Kumar, John Wiley & Sons, Inc., New York, 2018.

KEY AWARDS

- American Society for Composites/Destech Publications Award for Sustained Contributions to Composite Materials Technology (2009)
- College of Engineering Doctoral Dissertation Mentoring Award (2008-09)
- W.J. Emmons Award, 1999, Co-Author of Annual Award Paper, Association of Asphalt Paving Technologists
- Professor Raymond L. Bisplinghoff Memorial Teaching Award (1989, 1991 & 1993) in recognition of outstanding teaching

AIAA, ASC, & ASME FELLOW

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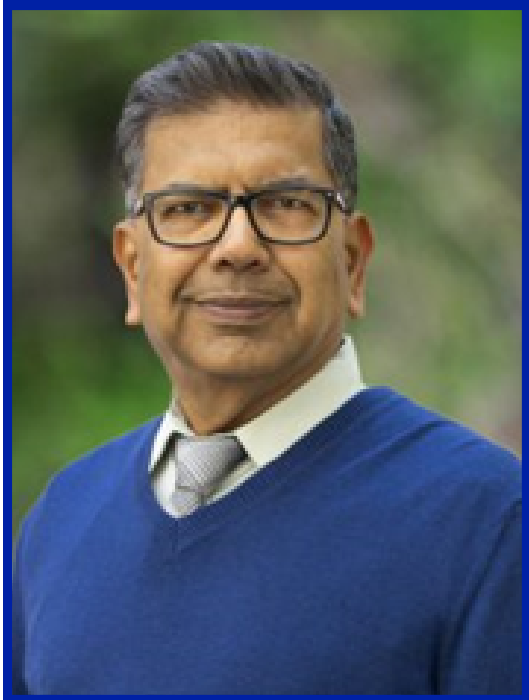

MALISA SARNTINORANONT

PROFESSOR

KEYWORDS

Biotransport, Soft tissue mechanics, Physiological fluid flow

OVERVIEW

Professor Sarntinoranont's research is focused on developing translational tools for patient therapies and to provide better understanding of the transport environment within tissues like brain and tumors. Because soft tissues are made up of both fluid and solid constituents, Dr. Sarntinoranont's lab is developing computational models that account for multi-phase, fluid-solid coupling that affects mechanics, flow and drug delivery. Clinical imaging scans are used to generate 3D, image-based models of the brain, tumors and engineered tissues. Specific applications include reactor transport, local drug delivery, MRI-based models, interstitial flows, glymphatics, traumatic brain injury and soft tissue testing.

SELECTED PUBLICATIONS

- Rey, J., Ewing, J., Sarntinoranont, M., Effects of Leaky Tumor Vasculature on Tissue Stress and Porosity in a Biphasic Model of Brain Glioma, Biomechanics and Modeling in Mechanobiology, 2021.
- Magdoom KN, Brown A, Rey J, Mareci TH, King MA, Sarntinoranont M, MRI of whole rat brain perivascular network reveals role for ventricles in brain waste clearance," Scientific Reports 9(1):11480. 2019.
- Magdoom KN, Pishko GL, Rice L, Pampo C, Siemann DW, Sarntinoranont M. MRI-based computational model of heterogeneous tracer transport following local infusion into a mouse hind limb tumor. PLoS One. 2014.
- Lee SJ, King MA, Sun J, Xie HK, Subhash G, Sarntinoranont M. Measurement of viscoelastic properties in multiple anatomical regions of acute rat brain tissue slices. J Mech Behav Biomed Mater. 29:213-24. 2014
- Kim JH, Astary GW, Kantorovich S, Mareci TH, Carney PR, Sarntinoranont M. Voxelized computational model for convection-enhanced delivery in the rat ventral hippocampus: comparison with in vivo MR experimental studies. Ann Biomed Eng. 40(9):2043-58. 2012.

KEY AWARDS

- 2017 ASME Fellow

ASME FELLOW

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JONATHAN SCHEFFE

ASSOCIATE PROFESSOR

KEYWORDS

Renewable Energy, Hydrogen, Solar, Energy Storage

OVERVIEW

Professor Scheffe's research program is focused on innovative ways to utilize, produce and store energy from renewable resources, mitigate CO2 emissions, and use fundamental engineering principles to understand and scale-up processes for eventual adoption by industry. Research topics include the transformation of intermittent solar energy to more practical and combustible forms such as chemical commodities, or so called solar fuels (e.g. hydrogen, diesel, kerosene, gasoline), using solar heat to drive industrial processes, and storing solar energy thermally to use on demand for driving power production cycles. Our research breath spans from understanding the fundamental science that drives these processes to the testing and implementation of scalable prototype systems.

SELECTED PUBLICATIONS

- Warren, K.J., Carrillo, R.J., Greek, B., Hill, C.M. and Scheffe, J.R.*, 2020. Solar Reactor Demonstration of Efficient and Selective Syngas Production via Chemical-Looping Dry Reforming of Methane over Ceria. Energy Technology, 8(6), p.2000053.
- Scheffe J.R., McDaniel A.C., Allendorf M.D., Miller J.A., Weimer A.W., "High temperature water oxidation kinetics of cobalt ferrites for production of H2", Energy and Environmental Science, 2013, 6, 963-973
- Furler P., Scheffe J.R., Steinfeld A., "Syngas production by simultaneous splitting of H2O and CO2 via ceria redox reactions in a high-temperature solar reactor", Energy and Environmental Science, 2012, 5 (3), 6098-6103
- Warren, K.J. and Scheffe, J.R., 2019. Role of surface oxygen vacancy concentration on the dissociation of methane over nonstoichiometric ceria. The Journal of Physical Chemistry C, 123(21), pp.13208-13218.
- Carrillo R.J., Warren K.J, Scheffe J.R.*, Experimental Framework for Evaluation of the Thermodynamic and Kinetic Parameters of Metal-Oxides for Solar Thermochemical Fuel Production, Journal of Solar Energy Engineering, 2019, 141 (2), 021007

KEY AWARDS

- Guest Editor, Energy Technology, 2021, Special Issue on Solar Hydrogen Production
- Teacher of the Year, Department of Mechanical and Aerospace Engineering, University of Florida 2018,
- Former Chair of the ASME Solar Energy Division (2017)

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JOHN K. SCHUELLER

PROFESSOR

KEYWORDS

Off-highway vehicles, precision agriculture, manufacturing

OVERVIEW

Professor Schueller concentrates on the improving the economic and environmental sustainability of producing objects through the application of advanced mechanical and electrical engineering. One area of research is improving the machinery and methods used in agricultural crop production. He is recognized as one of the pioneers of precision agriculture in which agricultural machines are automatically controlled in a spatially-variable manner. His other main area of research is in metalcutting manufacturing. He has made contributions in research in the high-speed machining of metal alloys used in aerospace and other industries.

SELECTED PUBLICATIONS

- Schueller, J.K. 2021. Opinion: Opportunities and limitations of machine vision for yield mapping. Frontiers in Robotics and AI. 8:627280
- Bhattacharyya, A., J.K. Schueller, and S. Payne. 2020. Observation of Non-Taylorian tool wear and machining parameter selection for miniature milling of Ti-6Al-4V on regular CNC machines. Australian Journal of Mechanical Engineering. DOI: 10.1080/14484846.2020.1811514
- Khoury Junior, J.K., J.K. Schueller, F.A.C. Pinto, and E.D.T. Santos. 2020 Monitoring of flank wear and damage on turning cutting tools by image processing. Journal of Engineering and Exact Sciences. 6(2):0098-0106
- Queiroz, D.M., A.L.F. Coelho, D.M.S.M. Valente, and J.K. Schueller. 2020. Sensors applied to digital agriculture: A review. Revista Ciência Agronômica. 51(5):1-15.
- Schueller, J.K. 2020. Agricultural mechanization in the United States of America. Agricultural Mechanization in Asia, Africa, and Latin America. (50th Anniversary Issue.) 51(4):60-64.
- Gangaharan, S., T.F. Burks, and J.K. Schueller. 2019. A comparison of approaches for citrus canopy profile generation using ultrasonic and Leddar® sensors. Computers and Electronics in Agriculture. 156:71-83.
- Davis, B., D. Dabrow, R. Newell, A. Miller, J.K. Schueller, G. Xiao, S.Y. Liang, K.T. Hartwig, N.J. Ruzycki, Y. Sohn, and Y. Huang. 2018. Study of chip morphology and chip formation mechanism during machining of ECAE-processed titanium. Journal of Manufacturing Science and Engineering. 140(3):031008-1-12

KEY AWARDS

- Kishida
- Magoon
- Pinckney
- Teetor
- Vasey

SAE, ASABE, AND IAABE FELLOW

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CORIN SEGAL

PROFESSOR

KEYWORDS

Combustion, Propulsion, Cavitation, Supercritical Thermodynamics

OVERVIEW

Professor Segal's research is focused on high-speed airbreathing combustion, in particular in mixing and flameholding in supersonic, chemically reacting flows. As part of this activity Professor Segal has developed and operates a unique, two-stage, facility capable of non-vitiating simulation of ehthalpies to Mach 5 flight conditions and with hydrogen vitiation to Mach 6.5. Additional studies include thermodynamics of supercritical jet disintegration and mixing and cavitation in thermosensitive fluids.

SELECTED PUBLICATIONS

- C. Segal, "The Scramjet Engine: Processes and Characteristics", Cambridge University Press, Cambridge, United Kingdom, ISBN 0521838150, 272 pp (also in Chinese translation).
- "Subcritical to Supercritical Mixing", C. Segal and , S.A. Polikhov in Explosion dynamics and Hazards, S. Frolov, F. Zhang and P. Wolanski, eds., Torus-Press, 2010, ISBN978-5-94588-079-5, pp. 215-230.
- "Supercritical Mixing", S.A. Polikhov and C. Segal, in Deflagrative and Detonative Combustion, G. Roy and S. Frolov, eds., Torus-Press, 2010, ISBN978-5-94588-071-9, pp. 3-18.
- "Supersonic Mixing and Combustion", C. Segal, Encyclopedia of Aerospace Engineering, John Wiley&Sons, Ltd, ISBN-13: 978-0-470-75440-5.
- "The Scramjet Engine - Basic and Combined Cycles", C. Segal, Encyclopedia of Aerospace Engineering, John Wiley&Sons, Ltd, ISBN-13: 978-0-470-75440-5.
- "Experimental Study of Subcritical to Supercritical Jet Mixing" C. Segal and S. A. Polikhov, in Advancement in Energetic Materials and Chemical Propulsion, (Kenneth K. Kuo editor-in- chief), Beggell Publishing House, 2008, ISBN 978-1-56700, pp. 781-795.

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MARK SHEPLAK

PROFESSOR

KEYWORDS

Micromachined transducers, MEMS, electroacoustics, aeroacoustics, and fluid mechanics

OVERVIEW

Dr. Sheplak's research focuses on the design, fabrication, and characterization of high-performance, instrumentation-grade, MEMS-based sensors and actuators that enable the measurement, modeling, and control of various physical properties. Specific applications include technology development to enable large-channel count micromachined directional microphone arrays for aeroacoustic noise source localization and miniature skin-friction sensors for aerodynamic drag characterization and flow control.

SELECTED PUBLICATIONS

- Freidkes, B.R., Mills, D.A., Patterson, W.C., Fournier, P.M., and Sheplak, M., "A Flush-Mounted Dual-Axis Wall Shear Stress Sensor," J. Microelectromech. Syst., Vol. 29, No. 5, 960-965, Oct. 2020.
- Pabon, R.J., Ukeiley, L., Sheplak, M., and Keane, C.B., "Characteristics of Turbulent Boundary Layer Large Scale Motions Using Direct Fluctuating Wall Shear Stress Measurements," Phys. Rev. Fluids., Vol. 3, No., 11, Nov. 2018.
- Williams, M.D., Griffin, B.A., Reagan, T.N., Underbrink, J.R., and Sheplak, M., "Characterization of Aeroacoustic MEMS Microphones for Aircraft Fuselage Arrays," AIAA J., Vol. 50, 2744-2752, December 2012.
- Cattafesta, L., and Sheplak, M. "Actuators for Active Flow Control", Annual Review of Fluid Mechanics, vol. 43, no. 1, pp. 247–272, 2011.
- Naughton, J.W. and Sheplak, M. "Modern Developments in Shear Stress Measurement," Prog. Aerosp. Sci., Vol. 38, pp. 515 -570, 2002.

KEY AWARDS

- Boeing Accomplishment Award, 2006, 2012, 2016
- Fellow, Acoustical Society of America, 2009
- University of Florida College of Engineering Doctoral Dissertation Adviser/Mentoring Award, 2008-2009
- NASA Certificate of Recognition, 2000, 2008, 2009
- ONR Young Investigator Award 2000

EDUCATION

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Syracuse University

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S.A. SHERIF

PROFESSOR

KEYWORDS

Heat and Mass Transfer, Thermal System Design Optimization, Renewable Energy, HVAC and Refrigeration, Cryogenics

OVERVIEW

Professor Sherif's research is focused on frost and ice formation, thermodynamic design optimization of thermal systems, two-phase high-speed fluid dynamics, spacecraft thermal management, unconventional and complex refrigeration systems, CHP & distributed generation, heat transfer enhancement with phase change, solar and hydrogen energy, heat transfer in mini-channels, and cryogenics.

SELECTED PUBLICATIONS

- Zgheib, N., Farzaneh, M., Balachandar, S., and Sherif, S.A., "A Physics-Based Model for Frost Buildup under Turbulent Flow using Direct Numerical Simulations," Int. J. Heat and Mass Transfer, Vol. 182, January 2022, pp. 121915, https://doi.org/10.1016/j.ijheatmasstransfer.2021.121915
- El Kadi, K., Alnaimat, F., and Sherif, S.A., "Recent Advances in Condensation Heat Transfer in Mini and Micro Channels: A Comprehensive Review," Applied Thermal Engineering, Vol. 197, October 2021, pp. 117412 https://doi.org/10.1016/j.applthermaleng.2021.117412.
- Benitez, T., Sherif, S.A., and Benitez, J., "Heat and Mass Transfer on Rectangular and Annular Finned Surfaces of Heat Exchangers Operating under Frosting Conditions," Int. J. Heat and Mass Transfer, Vol. 136, June 2019, pp. 99-115, https://doi.org/10.1016/j.ijheatmasstransfer.2019.02.005
- Benitez, T. and Sherif, S.A., "Modeling Spatial and Temporal Frost Formation with Distributed Properties on a Flat Plate using the Orthogonal Collocation Method," Int. J. Refrigeration, Vol. 76, April 2017, pp. 193-205, http://dx.doi.org/10.1016/j.ijrefrig.2017.01.026
- Mehdizadeh, A, Sherif, S.A., and Lear, W.E., "Numerical Simulation of Thermofluid Characteristics of Two-Phase Slug Flow in Microchannels," Int. J. Heat and Mass Transfer, Vol. 54, No. 15-16, July 2011, pp. 3457-3465, https://doi.org/10.1016/j.ijheatmasstransfer.2011.03.040

KEY AWARDS

- ASME Heat Transfer Division 75th Anniversary Medal (2013)
- ASHRAE Exceptional Service Award (2010)
- ASHRAE Distinguished Service Award (2003)
- ASHRAE E.K. Campbell Award (1997)
- Kuwait Prize in Applied Sciences (2001)
- Best Paper Awards (ASME IMECE 2005 & AIAA ASM 2005)
- Awards for Dedicated Service to ASME J. Thermal Science & Eng. Applications (2019)
- ASME J. Heat Transfer (2011)
- ASME Heat Transfer Division (2014, 2010, 2008, 2007, 2005)
- ASME Advanced Energy Systems Division (2003, 1997)
- ASME Fluids Eng. Division (2010, 1994)
- ASME Solar Energy Division (2003)
- ASHRAE (2013, 2008, 1995)

RAES, ASHRAE & ASME FELLOW

EDUCATION

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JINGJING SHI

ASSISTANT PROFESSOR

KEYWORDS

Nanoscale energy transport, multi-scale modeling, interface thermal transport, power electronics, wide bandgap and ultra-bandgap semiconductors, carbon-based materials

OVERVIEW

Professor Shi's research focuses on understanding energy transport and conversion to solve thermal challenges in different systems, with an emphasis on wide and ultra-wide bandgap semiconductor devices for future power and radio-frequency applications. Her work utilizes multiscale modeling and experimental methods to understand effects of different mechanisms like atomistic structures and defects on energy transport in materials and at interfaces. The findings are leveraged for the electro-thermal codesign of power and RF devices to maximize their performance.

SELECTED PUBLICATIONS

- Shi, J., Yuan, C., Huang, H. L., Johnson, J., Chae, C., Wang, S., ... & Graham, S. (2021). Thermal Transport across Metal/β-Ga2O3 Interfaces. ACS Applied Materials & Interfaces, 13(24), 29083-29091.
- Koh, Y. R., Shi, J., Wang, B., Hu, R., Ahmad, H., Kerdsongpanya, S., ... & Hopkins, P. E. (2020). Thermal boundary conductance across epitaxial metal/sapphire interfaces. Physical Review B, 102(20), 205304.
- Chu, Y., Shi, J., Miao, K., Zhong, Y., Sarangapani, P., Fisher, T. S., ... & Kubis, T. (2019). Thermal boundary resistance predictions with non-equilibrium Green's function and molecular dynamics simulations. Applied Physics Letters, 115(23), 231601.
- Shi, J., Lee, J., Dong, Y., Roy, A., Fisher, T. S., & Ruan, X. (2018). Dominant phonon polarization conversion across dimensionally mismatched interfaces: Carbon-nanotube–graphene junction. Physical Review B, 97(13), 134309.
- Shi, J., Dong, Y., Fisher, T., & Ruan, X. (2015). Thermal transport across carbon nanotube-graphene covalent and van der Waals junctions. Journal of Applied Physics, 118(4), 044302.

KEY AWARDS

- 2021 ASME InterPACK Best Paper Award
- 2021 MRS Spring Meeting Best Poster Award
- 2019 Rising Stars in Mechanical Engineering

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JANE JAEJEONG SHIN

ASSISTANT PROFESSOR

KEYWORDS

Nonlinear Control, Robotics, AI, Reinforcement Learning

OVERVIEW

Professor Shin's research focuses on the development of a robotic system that can actively navigate dynamic environments using onboard sensors under the presence of uncertainties from the environment, sensors, and robot dynamics. Her research group uses information-theoretic, probabilistic, and computational geometric planning approaches that can work with the sensor perception information extracted from various machine learning techniques. Specific applications include sensor fusion for heterogeneous robotic systems, path planning of a mobile sensor system with complicated dynamics, underwater object identification with imaging sonar, and multi-target tracking with a multi-agent system under occlusions.

SELECTED PUBLICATIONS

- J. Shin, S. Chang, J. Weaver, et al., "Informative multiview planning for underwater sensors," IEEE Journal of Oceanic Engineering, pp. 1–19, 2022.
- J. H. Ramos, J. Shin, K. Volle, P. Buzaud, K. Brink, and P. Ganesh, "Information-aware guidance for magnetic anomaly-based navigation," (Accepted to and presented at 2022 International Conference on Intelligent Robots and Systems (IROS)).
- J. Shin, S. Chang, M. Bays, J. Weaver, T. Wettergren, and S. Ferrari, "Synthetic sonar image simulation with various seabed conditions for automatic target recognition," (Accepted to and presented at OCEANS 2022, Hampton Road)
- A. L. Diaz, A. Ortega, H. Tingle, A. Pulido, O. Cordero, M. Nelson, N. Cocoves, J. Shin, R. Carthy, B. Wilkinson, and P. Ifju, "The Bathy-Drone: An Autonomous Uncrewed Drone-Tethered Sonar System," Drones, vol. 6, no. 10, p. 294, Oct. 2022

KEY AWARDS

- 2020 Cornell Commercialization Fellowship
- 2020 NSF I-Corps Fellowship

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DOUGLAS SPEAROT

NEWTON C. EBAUGH PROFESSOR

KEYWORDS

Computational Mechanics, Plasticity, Fracture, Numerical Methods

OVERVIEW

Douglas Spearot's research group employs atomistic and mesoscale simulation techniques to study the mechanical and thermodynamic properties of materials, with a particular focus on the role of defects and interfaces. The information gleaned from atomistic and mesoscale simulations is used to construct a multiscale understanding of the behavior of material microstructures. Ultimately, this knowledge can be used to design material compositions and microstructures for specific or enhanced performance, particularly in extreme environments (high stresses, dynamic loading rates, and under radiation).

SELECTED PUBLICATIONS

- Bamney, D., Capolungo, L., Spearot, D.E. (2021) Role of equilibrium and non-equilibrium grain boundary stress fields on dislocation transmission, Journal of Materials Research, 36, 2687-2704.
- Luo, K., Wangari, C., Subhash, G., Spearot, D.E. (2020) Effect of loop defects on the high strain rate behavior of PEGDA hydrogels: A molecular dynamics study, The Journal of Physical Chemistry, 124, 2029-2039.
- Kacher, J., Pierron, O., Zhu, T., Spearot, D.E. (2019) Integrating in situ TEM experiments and atomistic simulations for defect mechanics, Current Opinions in Solid State & Materials Science, 123, 117-128.
- Dang, K.Q., Bamney, D., Bootsita, K., Capolungo, L., Spearot, D.E. (2019) Mobility of dislocations in aluminum: Faceting and asymmetry during nanoscale dislocation shear loop expansion, Acta Materialia, 168, 426-435.
- Sichani, M.M., Spearot, D.E. (2016) A molecular dynamics study of dislocation density generation and plastic relaxation during shock of single crystal Cu, Journal of Applied Physics, 120, 045902.
- Coleman, S., Spearot, D.E., Capolungo, L. (2013) Virtual diffraction analysis of Ni [010] symmetric tilt grain boundaries, Modeling and Simulation in Materials Science and Engineering, 21, 055020.

KEY AWARDS

- Newton C. Ebaugh Professorship (2021-2026)
- UF Term Professorship (2021-2024)
- Teacher of the Year MAE Department (2020)
- TMS MPMD Distinguished Service Award (2020)
- TMS Young Leader International Scholar Award (2012)
- NSF Career Award (2010-2015),
- TMS Young Leader Professional Development Award (2010)
- Ralph E. Powe Junior Faculty Enhancement Award (2007).

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GHATU SUBHASH

NEWTON C. EBAUGH PROFESSOR

KEYWORDS

Solid mechanics, material science and biomedical engineering, high strain rate and shock response of biomaterials and gels, processing-structure-property relationships in ultra-high temperature ceramics and ceramics, development of novel test methods for low density materials and experimental mechanics

OVERVIEW

Professor Subhash's research focusses on multiaxial behavior of advanced ceramics, metals, composites, gels and biological materials. He has developed novel experimental methods which have been patented and widely used. He has coauthored 210 peer-reviewed journal articles, 85 conference papers, 2-books, 7-patents and 7- book chapters. These have resulted in more than 9700 citations with an h-index of 54. He has advised 8-postdoctoral fellow, 39 PhD students, and 15 MS students. Many of his past students are employed in academia, national laboratories, and leading industries.

SELECTED PUBLICATIONS

- "Dynamic Response of Advanced Ceramics" Ghatu Subhash, Amnaya Awasthi, Dipankar Ghosh, Wiley Publishers; 358 pages, 2021,
- G. Subhash et al.,"Elastic Stress Wave Propagation Through a 180o Bend In A Square Cross-Sectional Bar" International Journal of Engineering Science 180 (2022) 103748
- J.R. Nance, G. Subhash, B. Sankar, N R. Haftka, -H Kim, C. Deck, S. Oswald, "Measurement of Residual Stress in Silicon Carbide Fibers of Tubular Composites Using Raman Spectroscopy" Acta Materialia 217 (2021) 117164
- A. A. Cheenady, A. Awasthi, M. DeVries, C. Haines, G. Subhash, "Shock response of single-crystal boron carbide along orientations with the highest and lowest elastic moduli", Physical Review B 104 (2021) 184110
- H. Zhou, J.P. Lanes, M. Sarntinoranont, G. Subhash, C. Simmons, "Label-Free Quantification of Soft Tissue Alignment by Polarized Raman Spectroscopy", Acta Biomaterialia, 136 (2021) 363-374

KEY AWARDS

- 2021 University of Florida Doctoral Dissertation Advisor/Mentoring Award
- 2021 B.J. Lazan Award, Society for Experimental Mechanics (SEM)
- Fellow of The American Ceramic Society (ACerS), Society for Experimental Mechanics (SEM) and American Society of Mechanical Engineers (ASME)
- University of Florida Research Foundation Professor (2020-2023 and 2013-2016)
- 2018 Frocht Award, Society for Experimental Mechanics (SEM)
- 2014 'Significant Contribution Award'

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XIN TANG

ASSISTANT PROFESSOR

KEYWORDS

Biophysics, Imaging, Optogenetics, Mechanobiology, Gene Editing

OVERVIEW

Professor Tang's research interests are to invent and apply new technologies to study the interplay between mechanics and biology. We integrate mechanics, biophysics, optics, electronics, nanotechnology, and biochemistry to earn new insights of cells in previously inaccessible spatial-temporal-structural-functional regimes. We apply physics/chemistry theory, numerical simulation, and statistics to understand the data. Current projects include studies on cell and molecular mechanics in cancer metastasis; development of quantitative in vivo/vitro functional imaging techniques for brain and cardiovascular system mapping; physical modeling of unconventional mechanobiology; and development of all-optical electrophysiology and bio-nanotechnology.

SELECTED PUBLICATIONS

- C. Liang, Q. Zhang, X. Chen, J. Liu, M. Tanaka, S. Wang, S. E. Lepler, Z. Jin, D. W. Siemann, B. Zeng, and X. Tang, Human cancer cells generate spontaneous calcium transients and intercellular waves that modulate tumor growth, Biomaterials (Impact Factor: 15.3), 2022, doi: 10.1016/j.biomaterials.2022.121823
- C. Liang, M. Huang, T. Li, L. Li, H. Sussman, Y. Dai, D. W. Siemann, M. Xie, and X. Tang, Towards an integrative understanding of cancer mechanobiology: calcium, YAP, and microRNA under biophysical forces, Soft Matter, 2022, doi: 10.1039/D1SM01618K
- Q. Luo, J. Zhang, G. Lin, M. Huang, M. Tanaka, S. Lepler, J. Guan, D. Siemann, and X. Tang, Automatic Multi-functional Integration Program (AMFIP) towards All-optical Mechano-electrophysiology Interrogation, PlosONE, 2021, doi: 10.1101/2021.03.31.437936
- J. Lee, A. A. Abdeen, X. Tang, T. A. Saif, and K. A. Kilian, Geometric guidance of integrin mediated traction stress during stem cell differentiation, Biomaterials, 2015, 69, 174-183, doi: 10.1016/j.biomaterials.2015.08.005
- X. Tang, T. B. Kuhlenschmidt, Q. Li, S. Ali, S. Lezmi, H. Chen, M. Pires-Alves, W. W. Laegreid, T. A. Saif, M. S. Kuhlenschmidt, A mechanically-induced colon cancer cell population shows increased metastatic potential. Mol Cancer (Impact Factor: 30.6), 2014; 13:131. doi: 10.1186/1476-4598-13-131

KEY AWARDS

- 2022 UF Research Opportunity Fund
- 2019, 2021 University Scholar Program
- 2018 UF Health Cancer Center Pilot Award
- 2018 The Gatorade Award for Assistant Professor

EDUCATION

Ph.D. 2013
University of Illinois at Urbana-Champaign

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JAMES A. TRAINHAM

PROFESSOR

KEYWORDS

Renewable energy, synthetic fuels, hydrogen, energy storage, electrochemistry, techno-economics

OVERVIEW

Professor Trainham's research interests are in high temperature solar energy applications: concentrated solar power, production of hydrogen, solar fuels, energy storage and high temperature materials. He is also interested in techno-economics of energy alternatives.

SELECTED PUBLICATIONS

- John Newman, Christopher A. Bonino and James A. Trainham; The Energy Future, Annual Review of Chemical and Biomolecular Engineering, 2018.9:153-174.
- Feng He, James Trainham, Gregory Parsons, John S. Newman and Fanxing Li; A hybrid solar-redox scheme for liquid fuel and hydrogen coproduction, Energy Environ. Sci., 2014,7, 2033-2042
- Bruce A. Cook, Christopher A. Bonino, James A. Trainham; Solid-state processing of oxidation-resistant molybdenum borosilicide composites for ultra-high-temperature applications, Journal of Materials Science, 2014, 49, 22, 7750
- Christopher A. Bonino, Javier J. Concepcion, James A. Trainham, Thomas J. Meyer, and John Newman; Water Electrolysis with a Homogeneous Catalyst in an Electrochemical Cell. J. Electrochem. Soc. 2013 volume 160, issue 10, F1143-F1150
- John Newman, Paul G. Hoertz, Christopher A. Bonino, and James A. Trainham; Review: An Economic Perspective on Liquid Solar Fuels, Journal of The Electrochemical Society, 159 (10) A1722-A1729 (2012).
- Trainham, J. A., Newman, J. S., Bonino, C. A., Hoertz, P. G., & Akunuri, S. N. (2012). Whither solar fuels? Current Opinion in Chemical Engineering, 1(3), 204–210.
- U.S. Patent 9.651, 313, James A. Trainham et. al, Particulate heat transfer fluid and related system and method, 2013.

KEY AWARDS

- National Academy of Engineering Election 1997.
- American Institute of Chemical Engineers (AIChE) Award for Chemical Engineering Practice, 2002
- Selected as "one of the 100 Chemical Engineers of the Modern Era" by the AIChE, 2008
- Elected Fellow AIChE, 2012
- AIChE Industry Leadership Award, 2016.

EDUCATION

Ph.D. 1979
University of California, Berkeley

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MATTHEW J. TRAUM

SENIOR LECTURER & ASSOCIATE INSTRUCTIONAL PROFESSOR

KEYWORDS

STEM Kits for Remote Hands-on Education, Large Enrollment Capstone Design Instruction, K-12 STEM Pipeline, Tesla Turbines

OVERVIEW

Dr. Traum is a mechanical engineering pedagogy and teaching practice expert. He creates, designs, implements, and assesses hands-on kits for remote, in-person, and hybrid lab-intensive STEM education. His research also seeks, develops, implements, and evaluates best practices for effective large enrollment Capstone engineering design course instruction. Dr. Traum's K-12 STEM pipeline activities include STEM Tank, an award-winning summer experience for high school students from socio-economically disadvantaged communities. Also a subject expert in Energy-Thermal-Fluid Sciences, Dr. Traum conducts Tesla turbines research exploring potential for energy recovery from low-thermal-quality sources.

SELECTED PUBLICATIONS

- M. J. Traum, F. Hadi, "A Miniaturized Circular Hydraulic Jump for Remote On-Line Fluid Mechanics Instruction," Journal of Online Engineering Education, Vol. 10, No. 1, Article 3, June 2019.
- L. E. Rogers, K. J. Stubbs, N. A. Thomas, S. R. Niemi, A. Rubiano, M. J. Traum, "Transitioning Oral Presentations Online in Large-Enrollment Capstone Design Courses Increases Panelist Participation," Advances in Engineering Education, Vol. 8, No. 4, Fall 2020.
- M. J. Traum, J. Fiorentine, "Rapid Evaluation On-Line Assessment of Student Learning Gains for Just-In-Time Course Modification," Journal of Online Engineering Education, Vol. 12, No. 1, Article 2, June 2021.
- M. J. Traum, F. Hadi, M. K. Akbar, "Extending 'Assessment of Tesla Turbine Performance' Model for Sensitivity-Focused Experimental Design," ASME Journal of Energy Resources Technology, Volume 140, Number 3, March 2018.
- M. J. Traum, L. E. Mendoza Zambrano, "A Fluids Experiment for Remote Learners to Test the Unsteady Bernoulli Equation Using a Burette," IMECE2021-12356, Proceedings of the ASME 2021 International Mechanical Engineering Congress and Exposition (IMECE2021), Virtual - Online, November 1-5, 2021.

KEY AWARDS

- University of Florida Superior Accomplishment Award for Community Service, Division 3 – Academic Affairs, 2021
- WACE Exemplary Practice Award, 1st Place for STEMTank, Association of Florida Colleges Workforce Adult & Continuing Education Commission (WACE), 2020

ASEE PCEE DIVISION EXCOMM MEMBER

EDUCATION

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LAWRENCE UKEILEY

PROFESSOR

KEYWORDS

Turbulence, Aeroacoustics, Flow Control, Experimental Methods, Reduced Order Models

OVERVIEW

Professor Ukeiley's research is focused on the elucidation of flow physics in a wide range of flow configurations for the application of flow control methods leading to an engineering benefit. His laboratory uses a wide range of experimental facilities with modern experimental techniques (both optical and in flow sensors) to study the flow applications. Specific applications have included low speed bio-inspired configurations for flapping flight, propulsion exhaust of supersonic and subsonic aircraft, flow over open recesses and turbulent boundary layers.

SELECTED PUBLICATIONS

- S. Li and L. Ukeiley, "Experimental Investigation of the Fluctuating Static Pressure in a Subsonic Axisymmetric Jet," International Journal of Aeroacoustics, Vol. 20(3-4) (2021).
- S. Singh and L. Ukeiley, "Proper Orthogonal Decomposition of High-Speed Particle Image Velocimetry in an Open Cavity," AIAA Journal, Vol. 58(7), (2020).
- A. Nickels, L. Ukeiley, R. Reger, L. Cattafesta, "Low-Order Estimation of the Velocity, Hydrodynamic Pressure, and Acoustic Radiation for a Three-Dimensional Turbulent Wall Jet," Experimental Thermal and Fluid Sciences, Vol. 116 (2020).
- R. Pabon, L. Ukeiley, M. Sheplak, and C. Keane, "Characteristics of Turbulent Boundary Layer Large Scale Motions Using Direct Fluctuating Wall Shear Stress Measurements," Physical Review Fluids, Vol. 3(11) (2018).
- K. Taira, S. Brunton, S. Dawson, C. Rowley, T. Colonius, B. McKeon, O. Schmidt, S. Gordeyev, V. Theofillis, and L. Ukeiley, "Modal Analysis of Fluid Flows: An Overview," AIAA Journal, Vol. 55(12) (2017).

KEY AWARDS

- AIAA/Gordon C. Oates Graduate Scholarship
- NATO-RTO Scientific Achievement Award
- AIAA Certificate of Distinguished Service

ASME FELLOW & AIAA ASSOCIATE FELLOW

EDUCATION

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YU WANG

ASSISTANT PROFESSOR

KEYWORDS

Cyber-Physical Systems, Autonomy, AI/ML, Security and Privacy

OVERVIEW

Dr. Wang's research interest is on the intersection of control and computation. His work focuses on achieve smart autonomy for cyber-physical systems, where complex physical processes are tightly connected to cyber controllers. He developed data-driven methods for complex decision-making problems in unknown and adversarial environments by combining machine learning and mathematical logic. These methods aim to provide assurance, particularly in security and privacy, for self-driving cars, unmanned aerial vehicles, smart grids, and traffic networks.

SELECTED PUBLICATIONS

- Yu Wang, Hussein Sibai, Mark Yen, Sayan Mitra, and Geir E. Dullerud, "Differentially private algorithms for statistical verification of cyber-physical systems". IEEE Open Journal of Control Systems (OJ-CSYS), in press, 2022.
- Amir Khazraei, Spencer Hallyburton, Qitong Gao, Yu Wang, and Miroslav Pajic, "Learning-Based Vulnerability Analysis of Cyber-Physical Systems", ACM/IEEE International Conference on Cyber-Physical Systems (ICCPS), pp. 259-269, Milan, Italy, May 2022.
- Yu Wang, Mojtaba Zarei, Borzoo Bonakdarpour, and Miroslav Pajic, "Probabilistic conformance for cyber-physical systems", ACM/IEEE International Conference on Cyber-Physical Systems (ICCPS), pp. 55-66, Nashville, USA, May 2021.
- Alper Kamil Bozkurt, Yu Wang, Michael Zavlanos, and Miroslav Pajic, "Control Synthesis from Linear Temporal Logic Specifications Using Model-Free Reinforcement Learning", IEEE International Conference on Robotics and Automation (ICRA), pp. 10349-10355, Paris, France, May 2020.
- Yu Wang, Mojtaba Zarei, Borzoo Bonakdarpour, and Miroslav Pajic, "Statistical Verification of Hyperproperties for Cyber-Physical Systems", ACM Transactions on Embedded Computing Systems (TECS), vol. 18, no. 5s, pp. 1-23, 2019

KEY AWARDS

- 2019 Best Paper Finalist, ACM SIGBED International Conference on Embedded Software (EMSOFT)

EDUCATION

Ph.D. 2018
University of Illinois at Urbana-Champaign

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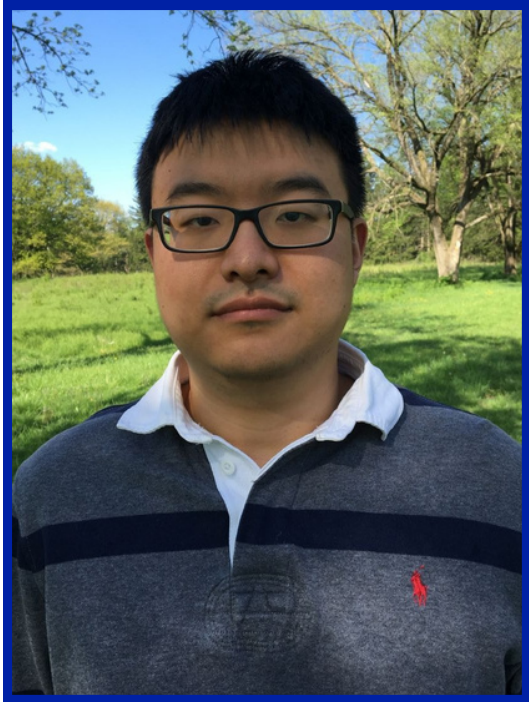

PETER WASS

RESEARCH SCIENTIST

KEYWORDS

Spacecraft instrumentation, precision measurements, space environment

OVERVIEW

Dr Wass' research in the Precision Space Systems Laboratory is focused on developing instrumentation that enables ultra-sensitive gravitational measurements, especially in space. Applications for this technology lie in astrophysics, for example in the detection of gravitational waves with the Laser Interferometer Space Antenna (LISA) mission and in Earth science, for monitoring the changing distribution of mass in water and ice at the Earth's surface with a satellite geodesy mission similar to the currently operating Grace Follow-on mission. Instrumentation makes use of high-precision mechanical systems, digital and analog electronics and spacecraft control algorithms.

SELECTED PUBLICATIONS

- H. Inchauspé, M. Hewitson, O. Sauter, P. J. Wass, "On a new LISA dynamics feedback control scheme: Common-mode isolation of test mass control and probes of test-mass acceleration" arXiv preprint arXiv:2202.12735, submitted to Physical Review D
- A. D. Alvarez, A. Knudston, U. Patel, J. Gleason, H. Hollis, J. Sanjuan, N. Doughty, G. McDaniel, J. Lee, J. Leitch, S. Bennett, R. Bevilacqua, G. Mueller, R. Spero, B. Ware, P. J. Wass, D. Wiese, J. Ziemer, J. W. Conklin, "A Simplified Gravitational Reference Sensor for Satellite Geodesy" arXiv preprint arXiv:2107.08545, submitted to Journal of Geodesy
- Beyond the Required LISA Free-Fall Performance: New LISA Pathfinder Results down to 20μHz. Armano, M. et. al. Phys Rev Lett, Vo. 120(6) Iss. 061101(2018)
- The LISA Pathfinder collaboration (M. Armano et al.) "Charge-Induced Force-Noise on Free-Falling Test Masses: Results from LISA Pathfinder". Physical Review Letters, Vol. 118 Iss. 17 (2017)
- A. Cavalleri, G. Ciani, R. Dolesi, A. Heptonstall, M. Hueller, D. Nicolodi, S. Rowan, D. Tombolato, S. Vitale, P. J. Wass, P. J. and W. J. Weber
- "Increased Brownian Force Noise from Molecular Impacts in a Constrained Volume" Physical Review Letters Vol. 103 Iss. 14 (2009)

KEY AWARDS

- 2016 ESA Team Achievement award for LISA Pathfinder collaboration
- 2012 COSPAR Zeldovich medal (Commission H) for contribution to LISA Pathfinder

IEEE & ASME FELLOW

EDUCATION

Ph.D. 2007
Imperial College London

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GLORIA WIENS

ASSOCIATE PROFESSOR

KEYWORDS

Cobots / Robotics, Mechanisms, Controls, Manufacturing Automation

OVERVIEW

Professor Wiens' research is focused on human-robot collaboration for smart manufacturing, integrating AI with robot control in providing augmented intelligence of robots interacting with humans, other robots and machines. She has expertise in dynamics and controls of flexible multibody systems; system identification; intelligent event-driven and physics-based controls; sensor-enabled dynamic (active) fixturing for micro/mesoscale manufacturing systems; system automation; modeling and design of MEMS devices; and design, path-planning, dynamics-control of reconfigurable, cooperative multi-robotic systems.

SELECTED PUBLICATIONS

- G. Streitmatter, J. Flowers, and G. Wiens, "High Fidelity Human Modeling via Integration of Skeleton Tracking for Predictive HRC Collision Detection", Proceedings of ASME International Mechanical Engineering Congress and Exposition, IMECE2021-68054, 10pp. (2021).
- J.T. Flowers, and G.J. Wiens, "Collaborative Robot Risk of Passage Among Dynamic Obstacles", Proceedings of ASME Manufacturing Science and Engineering Conference, MSEC2021-1977, 10pp., (2021).
- M.L. Nicora, R. Ambrosetti, G.J. Wiens, and I. Fassi, "Human-Robot Collaboration In Smart Manufacturing: Robot Reactive Behavior Intelligence", ASME Journal of Manufacturing Science and Engineering, Vol. 143, No. 3, pp. 31-40 (2021) (nominated best-paper).
- T.B. Rippere, K.J. Rao, and G.J. Wiens, "Modeling and Analysis of Fixel Designs for Micromanufacturing Active Fixturing", ASME Journal of Manufacturing Science and Engineering, Vol. 133, Issue 2, 4 pp. (2011).
- M.-S. Lu, and G.J. Wiens, "Predictive-Pull Based Control of an Unmanned Manufacturing Cell, Accounting for Robot Mobility", Intl. Jr. of Robotics and Computer-Integrated Manufacturing, Vol. 18, No. 2, pp. 83-94 (2002).

KEY AWARDS

- 2016 U.S. Department of Commerce, Certificate of Appreciation
- 2013-2015 ASME Foundation Swanson Fellow (plus AAAS 2013-2014 Fellows Program)
- 2010 National Research Council – Senior Research Associate, AFRL/RVSV-Kirtland
- 2009 NSF Women's International Research Engineering Summit (WIRES)
- 2000 German-American Frontiers of Engineers sponsored by National Academy of Engineering
- 2000 ASME Dedicated Service Award
- 1999 ASME Manufacturing Engineering Division - Outstanding Service Award
- 1995 LaRoux K. Gillespie Outstanding Young Manufacturing Engineer
- 1990 Ralph R. Teetor Educational Award.

ASME FELLOW

EDUCATION

Ph.D. 1986
The University of Michigan

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