Faculty Scholarly Publications and Research Grants

School of Engineering and Applied Sciences

UNIVERSITY OF THE DISTRICT OF COLUMBIA
1851

2017 – 2018

4200 Connecticut Avenue NW

Washington, D.C. 20008

www.udc.edu/seas

The School of Engineering and Applied Sciences (SEAS) offers nationally competitive and fully accredited professional programs at the bachelors, masters, and doctoral degree levels.

RESEARCH INITIATIVES AND CAPABILITIES

Research capabilities include Cyber Security, Cloud Computing Information Assurance, High Performance Computing, Wireless and Sensor Networks, Computational Intelligence, Computational Geometry, Robotics & Autonomous Systems, Mechatronics, Energy Conversion, Modeling and Simulation, Advanced Manufacturing, Product Design, Nanotechnology, Thermal Science, Optical Engineering, Renewable Energy, Rehabilitation Engineering and Bio-assisted devices, Structural Engineering, Intelligent Transportation System, Water Resources

BACHELOR OF SCIENCE

Biomedical Engineering (BSBME)

Civil Engineering (BSCE)

Computer Science (BSCS)

Electrical Engineering (BSEE)

Information Technology (BSIT)

Mechanical Engineering (BSME)

MASTER OF SCIENCE

Civil Engineering (MSCE)

Computer Science (MSCS)

Electrical Engineering (MSEE)

Mechanical Engineering (MSME)

DOCTOR OF PHILOSOPHY

Computer Science & Engineering (PhD)

DEAN

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DEPARTMENT CHAIRS

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Engineering, and Construction Engineering. The School has The Center for Biomedical and Rehabilitation Engineering that focuses on studying human mobility and The SEAS Research Center.

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A Note from the Dean

It is with great pleasure that I introduce the report on the scholarly, creative, and professional work by our faculty. In addition to excellent teaching, the School of Engineering and Applied Sciences (SEAS) at the University of the District of Columbia believes that scholarship and involvement in grantsmanship are important to sustain excellence in engineering and computer science education and research.

The scholarly activities at SEAS are uniquely focused on student experience and engagement. Several students have been awarded prestigious internships including research at NASA, NIST, Naval Research Laboratory, Air Force Research Laboratory, Goddard National Laboratory, Apple, Intel, Boston Scientific, Boeing and more.

UDC is a vibrant place with faculty collaborating on interdisciplinary grant proposals, numerous research projects mentored by SEAS faculty, and student teams working on real-world projects. Our students have achieved excellence in national competitions including NASA's 2019 Revolutionary Aerospace Systems Concepts – Academic Linkage (RASC-AL) Moon to Mars Ice and Prospecting Challenge, NASA Human Exploration Rover Challenge, and Advancing Minorities' Interest in Engineering (AMIE) Design Challenge.

These activities have contributed to SEAS achieving national recognition.

Dr. Devdas Shetty
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Grants Awarded to SEAS
2017-2018

GRANTS

NSF grant of **$989,475** for the project "Scholarships and Mentoring to Increase the Academic Success of Students in Science, Technology, Engineering, and Mathematics," by Freddie M. Dixon, **Aboise O. Adebayo**. February 1, 2019 and ends January 31, 2024.

Pradeep Behera (PI), United States Geological Survey (USGS)/DCWRRI, Project ID: 2018DC145B (**$15,980**) Title: Runoff Control Performance Evaluation and Development of Design Guideline for Green Roof Systems for District of Columbia, (01/03/2018-02/29/2019).

PI: **Paul Cotae** –*Army Research Office (ARO)*-–Award No. W911NF-15-1-0481: "*Performance Data-Driven Methods and Tools for Computer Network Defense through Network Science*", Period: August 21, 2015- August 21, 2019 **$594,755**.

PI: **Sasan Haghani**, Co-PI: **Jiajun Xu** "Firebird Ice Rectifier and Extractor (FIRE)", The National Institute of Aerospace (NIA), Special Edition: Moon to Mars Ice & Prospecting Challenge) **$10,000**, January 2019 – July 2019.

PI: **Sasan Haghani**, Co-PI: **Jiajun Xu** "Implementation of the 2019 NASA Mars Human Exploration Rover: An Experiential Learning Project for STEM Students at UDC", National Aeronautics and Space Administration (NASA), **$59,981**, November 2018 – August 2019.

Sasan Haghani (PI), **Jiajun Xu** (Co-PI), "Implementation of the University of the District of Columbia Human Exploration Rover" Source of Support: National Aeronautics and Space Administration (NASA), Amount: **$79,926** Duration: 11/2017-08/2019.

PI: **Kate Klein** (PI), Co-PI: **Sasan Haghani, Amir Shahirinia, Pawan Tyagi, Lara Thompson, Pradeep Behera, Wagdy Mahmoud, Esther Ososanya, Jiajun Xu, Lei Wang, Devdas Shetty,** "*Professional Research Experience Program at the University of the District of Columbia (PREP-UDC)*", National Institute of Standards and Technology (NIST), **$6,761,811**, June 2018 – June 2023.

PI: **Kate Klein**, NIST Summer Undergraduate Research Fellowship Grant, 2017: $11.5k in 2017, $16.7k in 2018.

PI: **Kate Klein**, ASM Teachers Camp Contract through BEST, $12k in 2017 and 2018.

Lily R. Liang, NSF award: PKAL Capital Region Network Workshop at UDC, **$49,947.05**, August 1st, 2015 ~ July 31, 2019.

Thompson LA (PI) (**$299,996**). Research Initiation Award (RIA): Investigating a new Generation of Assistive, Innovative Technologies (GAIT) for balance rehabilitation. Historically Black Colleges and Universities Undergraduate Program (HBCU-UP), National Science Foundation (March 2017 - 2020).

Thompson LA (PI), Zhang N (**$99,997**). EAGER: Nurturing Women's Innovativeness and Strength in Engineering through experiential learning in biomedical engineering (WISE). Division of Undergraduate Education (DUE), National Science Foundation (March 2017 - 2020).

Thompson LA (PI), Haghani S, Zhang N (**$399,991**). Targeted Infusion Project: Integration, Cultivation, and Exposure to Biomedical Engineering at the University of the District of Columbia. Historically Black Colleges and Universities Undergraduate Program (HBCU-UP), National Science Foundation (July 15, 2015- June 30, 2019).

PI: **Pawan Tyagi**, co-PI: **Kate Klein** and **Jiajun Xu**, Additive Manufacturing Post Processing Partnership, Funder: Kansas City Nuclear Security Plant on Behalf of Depart of Energy-NNSA, December 2018 – September 2019, **$108,000**.

PI: **Pawan Tyagi**, $56,000 from Kansas City Nuclear Security Complex in the area of Post Processing of Additive manufacturing from 2018-2019.

Grants Awarded to SEAS
2017-2018

PI: **Lei Wang**; Co-PI: **Pradeep K. Behera, Jiajun Xu, Sasan Haghani**; National Science Foundation Targeted Infusion Project: Integrating Risk and Resilience into Undergraduate Engineering Education Towards a Hazard-Resilient Built Environment. Award Number: 1818649; Organization: National Science Foundation; Award date: July 15, 2018-2021; Award amount: **$399,931.00**.

PI: **Lei Wang**; Co-PI: **Bryan Higgs** and **Pradeep K. Behera**, Development of Urban Sustainability Model for Metropolitan DC based on Population, Food, Water, Energy and Infrastructure, USGS DC Water Resources Research Institute (WRRI) Grant, Award Date: June 15, 2018; Award Amount: **$9,974**.

PI: **Lei Wang**, Robust Design for Resilient Geotechnical Infrastructures, UDC Faculty Incentive Research Grant Program, Award Date: May 17, 2018; Award Amount: **$5,000**.

PI: **Lei Wang**, Fellowship for the 2nd USUCGER Workshop for Early Career Junior Faculty Workshop, United States Universities Council on Geotechnical Education and Research (USUCGER), Award Date: April 9, 2018, Award Amount: **$850**.

PI: **Lei Wang**, Travel Grant for 2018 UC Davis Natural Hazards Engineering Research Infrastructure (NHERI) Geotechnical Centrifuge Workshop, University of California Davis, Award Date: April 5, 2018; Award Amount: $1,000.

PI: **Lei Wang**; Co-PI: **Jiajun Xu**, Tolessa Deksissa, Development of A New and Optimal Geothermal System for Urban Agriculture Sustainability and Food Security in the District of Columbia, USDA/National Institute of Food and Agriculture (NIFA), Award Date: Dec 20, 2018; Award Amount: $90,000.

PI: Anika Burtin, Co-PIs: **Briana L. Wellman** and Tolessa Dekissa. Robert Noyce Scholarship Program grant for "Project Firebirds Reinventing STEM Teaching (Project FRST)", National Science Foundation. Award Date, Sept 1, 2015-August 31, 2021. Award Total, $2,146,100.

PI: **Briana L. Wellman**. Louis Stokes Alliance for Minority Participation, National Science Foundation. Award Date: September 1, 2017- August 31, 2018. Award Amount: $58,750 (yearly).

Nian Zhang (PI), **Lara Thompson** and **Devdas Shetty** (Senior Personnel) "An Intelligent Optimization, Clustering and Classification Framework for Large Scale Photo-Thermal Infrared Imaging Spectroscopy (PT-IRIS) Big Data," Department of Defense (DoD), **$551,889**.

Nian Zhang (PI), "Deep Supervised and Unsupervised Learning to Explore Feature Selection and Classification in Large Scale Photo-Thermal Infrared Imaging Spectroscopy (PT-IRIS) Big Data," National Science Foundation. Supplemental Funding Request. **$39,998**. 8/24/16 – 6/30/19.

Nian Zhang (PI), "An Intelligent Optimization, Clustering and Classification Framework for High Dimensional, Overlapped Classes, and Imbalanced Data," National Science Foundation. **$199,999**. 7/15/15 – 6/30/19.

Jiajun Xu (PI) (**$299,934**). Research Initiation Award: Experimental and Multiscale Simulation Study of Nanoscale Thermal Transport and Evaporation/Boiling Heat Transfer using Self-assembled Nanoemulsions, National Science Foundation (4/30/2016 - 2019).

Acquisition of a Laser Rapid Manufacturing System, BEAM: Broadening Education through Advanced Manufacturing at UDC", Department of the Army, US Army Research, Development and Engineering Command, Amount: **$500,000**. **Jiajun Xu** (PI), **Pawan Tyagi**, **L. Thompson**, **Kate Klein** and **Devdas Shetty**.

Dr. Pradeep Behera

Peer-Reviewed Papers and Conference Presentations

Pradeep K Behera, "Can Senior Capstone Project Course provide Real-world Work Experience?", Third North American International Conference on Industrial Engineering and Operations Management Conference, Washington, DC, September 27-29, 2018.

Pradeep Behera, Ahmet Zeytinci, Lei Wang and Bryan Higgs, "Transformation of Civil Engineering Senior Capstone Project Course at UDC", ASEE Mid-Atlantic Conference, Washington DC, April 6-7, 2018.

Pradeep K Behera, Ramesh Teegavarapu, Chandra Pathak and Chandramouli Viswanatha Chandramouli, "Variability of Storm Event Characteristics in Different Climate Zones of Continental United States: Implications for Stormwater Management and Hydrologic Design" *2017 World Environmental & Water Resources Congress,* Sacramento, California, May 21-25, 2017.

Pradeep Behera, Ph.D., P.E., D.WRE
Professor of Civil Engineering

Areas of Expertise
- Water resources engineering
- Urban water systems
- Storm water management
- Non-point source pollution
- Climate change

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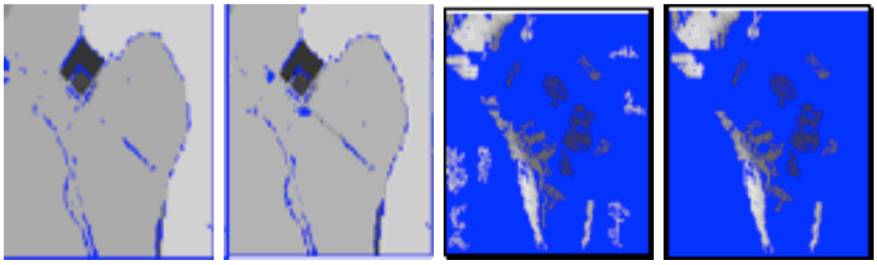
Dr. Li Chen

Peer-Reviewed Papers and Conference Presentations

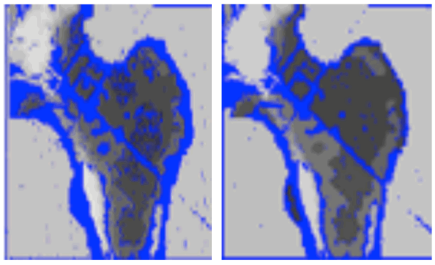
C. Concolato, **L. Chen**, Data science: A new paradigm in the age of big-data science and analytics, New Mathematics and Natural Computation 13 (02), 119-143, 2017.

L. Chen, Undergraduate Computer Science Capstone Projects: Experiences and Examples, 2018 ASEE Mid-Atlantic Spring Conference, UDC, Washington, D.C., April 6-7, 2018.

L. Chen, VBS Prasath, Measuring Bone Density Connectivity Using Dual Energy X-Ray Absorptiometry Images, International Journal of Fuzzy Logic and Intelligent Systems 17 (4), 235-244, 2017.



(a) $\lambda = 0.93$ (b) $\lambda = 0.94$ (c) $\lambda = 0.99$ (d) $\lambda = 1$



(e) $\lambda = 0.98$ (f) $\lambda = 0.97$

Li Chen, The discrete method for decomposition of n-spheres and n-manifolds, Lehigh geometry/ topology conference, May 24-27, 2018.

L. Chen, Some Current Developments of Image Segmentation, 2018 IEOM DC Conference Industrial Engineering and Operations Management Conference, September 27-29, 2018 (UDC).

Li Chen, Ph.D.
Professor of Civil Engineering

Areas of Expertise

- Image processing
- Object-oriented programming and design
- Algorithm design and complexity
- Discrete Geometry and Digital Geometry
- Data Science: Theory and Applications

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Faculty Members and Peer-Reviewed Papers and Conference Presentations
2017-2018

Dr. Paul Cotae

Peer-Reviewed Papers and Conference Presentations

Paul Cotae, Mahmoud Elsayed "On the Performance and Modulation Techniques of Underwater Acoustic Sensors Network". *Transaction on Techniques in STEM Education*, Vol. 3, pp. 11-20, ISSN: 2381-649X January - September, 2018.

Rashed Rabie and **Paul Cotae**, "Network Congestion Control and Low Rate Denial of Service Attacks" *Transaction on Techniques in STEM Education*, Vol.2, No.3, pp.91-99, ISSN: 2381-649X April - June 2017.

Osman Ali, **Paul Cotae,** "Towards DoS/DDoS Attack Detection Using Artificial Neural Networks" *Proceedings of the IEEE UEMCON - 2018*, Columbia University 8th -10th November 2018, pp. 227 – 232, Nov. 2018.

Paul Cotae, Rashed Rabie "On a Game Theoretic Approach to Detect the Low-Rate Denial of Service Attacks", *IEEE COMM2018*, *the 12th International Conference on Communication (COMM)*, Bucharest Romania, 14-16 June, pp. 19-26, 2018. **DOI:** 10.1109/ICComm.2018.8429980.

Yasser Salem, **Paul Cotae,** "Analysis of Distributed Denial Service Attacks Detection Using Fisher Statistical Methods" 2018 ASEE Mid-Atlantic Fall Conference, BTHS, New York, Brooklyn October 26 -27, 2018.

Mohamed Alshaer, **Paul Cotae",** On Identifying the Critical Nodes and Vulnerable Edges for Increasing Network Security", *ASEE St. Lawrence Conference at Cornell University*, 20-21 April 2018.

Luis Aguinaga, **Paul Cotae** "Node Centrality and Ranking Tool" *2018 ASEE Mid-Atlantic Spring Conference*, University of the District of Columbia, April 6-7, 2018.

Yasser Salem, **Paul Cotae** "Analysis of Low Rate of Denial of Service Attacks Detection by Using Fisher Methods", *2018 ASEE Mid-Atlantic Spring Conference*, University of the District of Columbia, April 6-7, 2018.

Dilnesa Nukuro, Nguyen Quoc, and **Paul Cotae**, "The importance of protecting vulnerability to improve the robustness of network", *2018 ASEE Mid -Atlantic Spring Conference,* University of the District of Columbia, April 6-7, 2018.

Osman Ali, **Paul Cotae,** "Towards DoS/DDoS Attack Detection Using Artificial Neural Networks" *Proceedings of the IEEE UEMCON - 2018*, Columbia University 8th -10th November 2018, pp. 227 – 232, Nov. 2018.

Paul Cotae, Rashed Rabie "On a Game Theoretic Approach to Detect the Low-Rate Denial of Service Attacks", *IEEE COMM2018*, *the 12th International Conference on Communication (COMM)*, Bucharest Romania, 14-16 June, pp. 19-26, 2018. **DOI:** 10.1109/ICComm.2018.8429980.

Yasser Salem, **Paul Cotae,** "Analysis of Distributed Denial Service Attacks Detection Using Fisher Statistical Methods" 2018 ASEE Mid-Atlantic Fall Conference, BTHS, New York, Brooklyn October 26 -27, 2018.

Paul Cotae, Rashed Rabie "On a Game Theoretic Approach to Detect the Low-Rate Denial of Service Attacks", *IEEE COMM2018*, *the 12th International Conference on Communication (COMM)*, Bucharest Romania, 14-16 June, pp. 19-26, 2018. DOI: 10.1109/ICComm.2018.8429980.

Luis Aguinaga, **Paul Cotae** "Node Centrality and Ranking Tool" *2018 ASEE Mid-Atlantic Spring Conference*, University of the District of Columbia, April 6-7, 2018.

Faculty Members and Peer-Reviewed Papers and Conference Presentations 2017-2018

Yasser Salem, **Paul Cotae** "Analysis of Low Rate of Denial of Service Attacks Detection by Using Fisher Methods", *2018 ASEE Mid-Atlantic Spring Conference*, University of the District of Columbia, April 6-7, 2018.

Dilnesa Nukuro, Nguyen Quoc, and **Paul Cotae**, "The importance of protecting vulnerability to improve the robustness of network", *2018 ASEE Mid -Atlantic Spring Conference,* University of the District of Columbia, April 6-7, 2018.

Rashed Rabie, **Paul Cotae** "Network Congestion Protocol and Low Rate Denial of Service Attacks", Proceedings *ASEE 2017 Gulf Southwest Annual Conference* at Erik Jonsson School of Engineering and Computer Science at UT Dallas, March 12-14, 2017.

Paul Cotae, Ph.D.
Professor of Electrical Engineering
SEAS Research Center Director
Ph.D. Program Director

Areas of Expertise

- Digital communication
- Cyber security
- Machine learning
- Anomaly detection
- Intrusion visualization

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Dr. Hongmei Dang

Peer-Reviewed Papers and Conference Presentations

Hongmei Dang, Esther Ososanya, Nian Zhang, Xiaohui Wang, Hojjatollah Sarvari and Vijay P. Singh , "Numerical Modeling Effect of Defects on Efficiency of Nanowire CdS-CdTe Solar Cells". 2017 IEEE PVSC-44 June 25-30, 2017 Washington, D.C.

Hongmei Dang, Esther Ososanya, Nian Zhang, Vijay Singh, "Numerical Modeling and Simulation of Stable Nanowire CdS-CdTe Solar Cells," 17th IEEE International Conference on Nanotechnology (IEEE NANO 2017), Pittsburgh, PA, July 25-28, 2017.

Hongmei Dang, Esther Ososanya, Nian Zhang and Vijay Singh, "Numerical Modeling and Simulation of Stable Nanowire CdS-CdTe Solar Cells", 17th IEEE Nanotechnology Conference.

Hongmei Dang, Ph.D.
Assistant Professor of Electrical Engineering

Areas of Expertise

- Nanoscale device fabrication & modelling
- Defect analysis
- Nanoscale electronic & solar cells
- 2D materials

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Dr. Max Denis

Peer-Reviewed Papers and Conference Presentations

Max F. Denis, Sandra L. Collier, John M. Noble, W. C. Kirkpatrick Alberts II, David A. Ligon, Leng K. Sim, Deryck James, and Christian G. Reiff, "*Acoustic remote sensing for source localization and atmospheric tomography: Applications of the cross-correlation Green's function retrieval method*", The Journal of the Acoustical Society of America, Vol. 144, No. 5, EL465-EL470, 2018.

Viksit Kumar, **Max Denis**, Adriana Gregory, Mahdi Bayat, Mohammad Mehrmohammadi, Robert Fazzio, Mostafa Fatemi, Azra Alizad "*Viscoelastic parameters as discriminators of breast masses: Initial human study results*", PLOS ONE, Vol. 13, No. 10, 2018.

Max F. Denis, Sandra L. Collier, John M. Noble, W. C. Kirkpatrick Alberts II, David A. Ligon, Leng K. Sim, Deryck James, and Christian G. Reiff, "*Green's function extraction by crosscorrelation and multidimensional deconvolution for outdoor sound propagation*", The Journal of the Acoustical Society of America, Vol. 144, No. 4, EL353-EL359, 2018.

Viksit Kumar, Jeremy M. Webb, Adriana Gregory, **Max Denis**, Duane D. Meixner, Mahdi Bayat, Dana H. Whaley, Mostafa Fatemi, Azra Alizad, "*Automated and real-time segmentation of suspicious breast masses using convolutional neural network*", PLOS ONE, Vol. 13, No. 5, 2018.

Max Denis, Leighton Wan, Mostafa Fatemi, Azra Alizad, "*Ultrasound Characterization of Bone Demineralization Using a Support Vector Machine*", Ultrasound in Medicine & Biology, Vol. 44, No. 3, 2018.

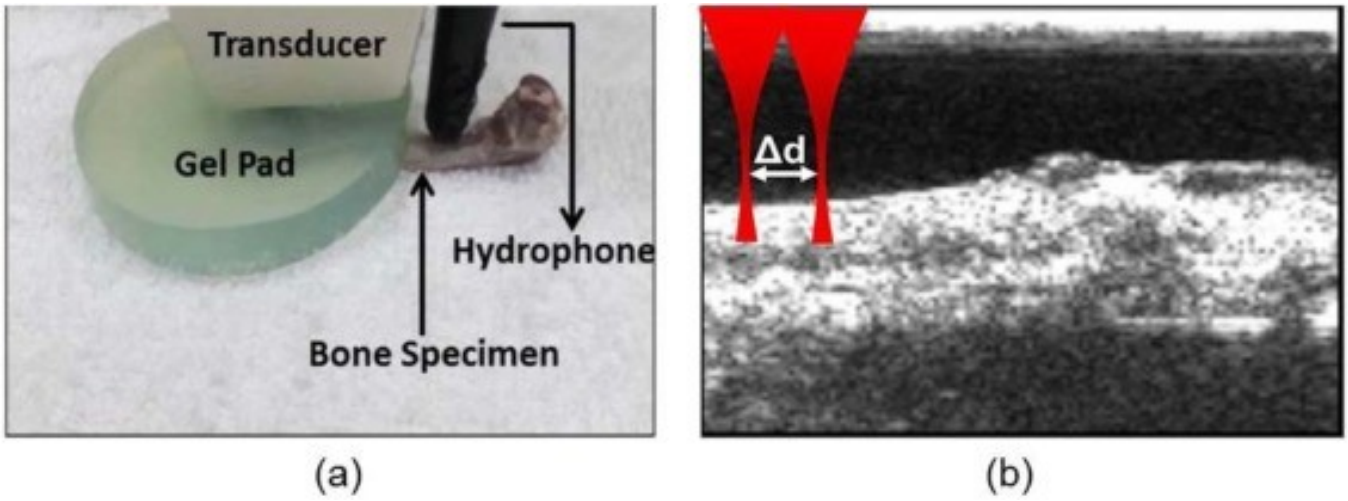

Fig. 4. Experimental setup. (a) Positioning of the transducer and the hydrophone on the bone. Gel pad is used to provide appropriate distance to focus the beam onto the bone surface. (b) B-Mode image revealing the bone surface. The ARF beams (red) are sequentially focused on the bone surface at a distance Δd apart.

Faculty Members and Peer-Reviewed Papers and Conference Presentations 2017-2018

Adriana Gregory, Mahdi Bayat, Viksit Kumar, **Max Denis**, Bae Hyung Kim, Jeremy Webb, Duane D. Meixner, Mabel Ryder, John M. Knudsen, Shigao Chen, Mostafa Fatemi, Azra Alizad, "*Differentiation of Benign and Malignant Thyroid Nodules by Using Comb-push Ultrasound Shear Elastography: A Preliminary Two-plane View Study*", Academic Radiology, Academic Radiology, Vol. 25, No. 11, 2018.

Mahdi Bayat, **Max Denis**, Adriana Gregory, Mohammad Mehrmohammadi, Viksit Kumar, Duane Meixner, Robert T. Fazzio, Mostafa Fatemi, Azra Alizad, "*Diagnostic features of quantitative comb-push shear elastography for breast lesion differentiation*", PLOS ONE, Vol. 12, No. 3, 2017.

Mahdi Bayat, Viksit Kumar, **Max Denis**, Jeremy Webb, Adriana Gregory, Mohammad Mehrmohammadi, Mathew Cheong, Douglas Husmann, Lance Mynderse, Azra Alizad, Mostafa Fatemi, "*Correlation of ultrasound bladder vibrometry assessment of bladder compliance with urodynamic study results*", PLOS ONE, Vol. 12, No. 6 2017. (This work was highlighted in Nature Reviews Urology: Clemens Thoma, "Urinary incontinence: Evaluating bladder wall properties with vibrometry", Nature Reviews Urology 2017).

Max Denis, Ph.D.
Assistant Professor of Mechanical Engineering

Areas of Expertise
- Diagnostic ultrasound & tissue elasticity imaging
- Breast and thyroid cancer detection
- Acoustic remote sensing

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Dr. Sasan Haghani

Peer-Reviewed Papers and Conference Presentations

N. Zhang, T. Le and **S. Haghani**, "An FPGA Implementation of an LMS Self- Adjusting Adaptive Noise Cancellation System for Audio Processing", *International Journal of Circuits and Electronics*, vol. 2, 2017, pp. 43-49.

N. Zhang, T. Le and **S. Haghani**, "Design and Implementation of FPGA Based LMS Self Adjusting Adaptive Filtering System for Audio Signal Processing", *WSEAS Transactions on Signal Processing*, vol. 13, 2017, pp. 256-263.

A. Rahimi, A. Ajmal, H. Patel and **S. Haghani**, "The Design and Implementation of a VR Gun Controller with Haptic Feedback", accepted for publication in the *Proc. IEEE International Conference on Consumer Electronics*, Las Vegas, NV, Jan. 2019.

S. Haghani, "Development of a New Course on Microgrids and Distributed Energy Resources", in *Proc. International Mechanical Engineering Congress & Exposition,* Pittsburgh, PA, Nov. 2018 pp. 1-5, Paper ID # IMECE2018-88506.

K. Chau, K. Mahani, M. Jafari and **S. Haghani**, "Solar-Powered Microgrid Capacity Planning for a General Hospital", *Proc. 2018 IEEE Green Energy and Smart Systems Conference,* Oct. 2018, pp. 1-6.

L. Zhu, **S. Haghani** and L. Najafizadeh, "Spatiotemporal Characterization of Brain Function Via Multiplex Visibility Graph", in *Biophotonics Congress: Biomedical Optics Congress 2018 (Microscopy/Translational/Brain/OTS)*, OSA Technical Digest (Optical Society of America, 2018), paper JTh3A.54.

S. Haghani, "Development of a new course on Smart Grid Communication and Security for Senior Undergraduate and Graduate Students", *Proc. of Annual ASEE Conference*, Salt Lake City, Utah, June 2018, pp. 1-14, Paper ID Paper ID #22099.

Z. Zyvith, M. Trevena, A. Young, R. Lamantia, L. Sharp and **S. Haghani**, "Geothermal Heating/ Cooling in Massachusetts General Hospital", *Proc. of ASEE Mid-Atlantic Section Spring Conference*, April 6, 2018, pp. 1-11, Paper ID #24362.

M. Rahimi and **S. Haghani**, "The Design and Implementation of a Smart Switch Outlet Adapter", *Proc. of ASEE Mid-Atlantic Section Spring Conference,* April 6, 2018. pp. 1-9, Paper ID #24383.

D. T. Nukuro, Z. G. Biru and **S. Haghani**, "The design and implementation of an intelligent letter box", *Proc. of ASEE Mid-Atlantic Section Spring Conference,* April 6, 2018. pp. 1-7, Paper ID #24386.

N. Chuenprateep, W. Abrams, A. Marshall and **S. Haghani**, "Modeling the Effect of Renewable Energy and Smart Appliances in Energy Reduction of Residential Homes Using GridLab-D", *Proc. of ASEE Annual Conference and Exposition*, June 25-28, 2017, pp. 1-12, Paper ID #18948.

Sasan Haghani, Ph.D.
Associate Professor of Electrical Engineering

Areas of Expertise
- Smart Grid and Renewable Energy
- Wireless Sensor Networks
- Broadband Communications

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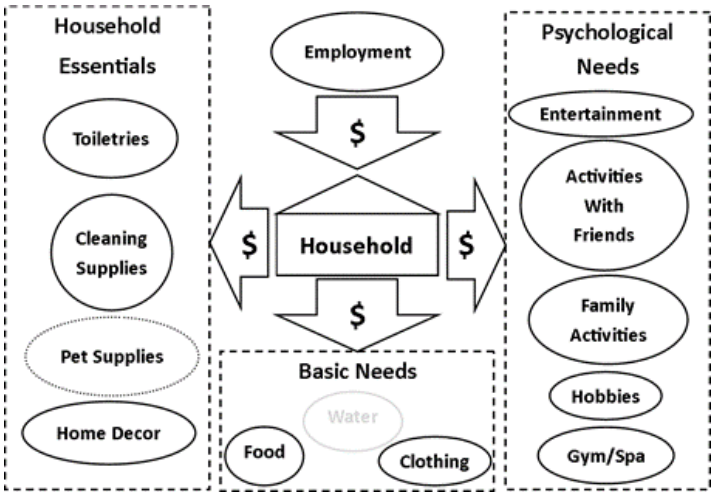
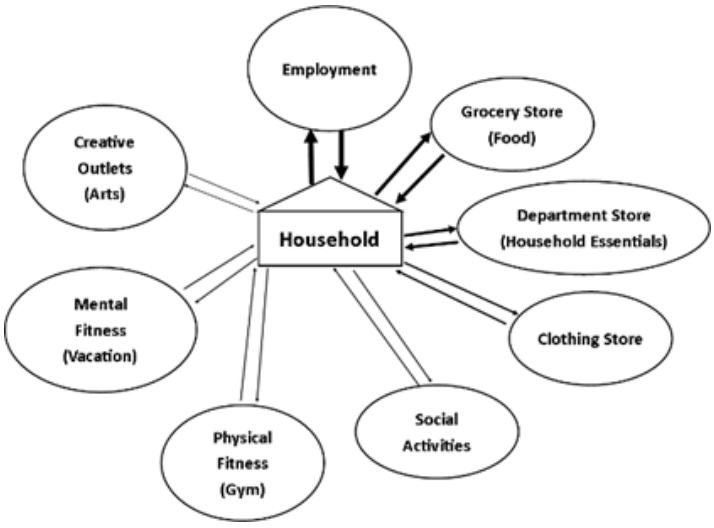
Dr. Bryan Higgs

Peer-Reviewed Papers and Conference Presentations

"Mapping Household Travel Footprints based on Psychological and Physiological Needs" B. Higgs and R. Guandique, 2018 Lockheed Fellowship.





Bryan Higgs, Ph.D.
Assistant Professor of Civil Engineering

Areas of Expertise

- Psychophysiological driver behavior
- Transportation network vulnerability and optimization
- Travel demand modeling
- Multi-level multi-objective game theory

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Dr. Dong Hyun Jeong

Peer-Reviewed Papers and Conference Presentations

SY Ji, **D.H. Jeong**, M Hassan, IK Ilev, Signature Infrared Bacteria Spectra Analyzed by an Advanced Integrative Computational Approach Developed for Identifying Bacteria Similarity, IEEE Journal of Selected Topics in Quantum Electronics 25 (1), 1-8, Jan 2019.

Duc Manh Doan, Clayton Gordon, **Dong H. Jeong**, Summit Selection: Designing a Feature Selection Technique to Support Mixed Data Analysis, SIGCSE '18 The 49th ACM Technical Symposium on Computer Science Education.

S.Y. Ji, K. Najarian, T. Huynh, **D.H. Jeong**, An Integration of Decision Tree and Visual Analysis to Analyze Intracranial Pressure, Neuroproteomics: Methods and Protocols, 405-419, May 2017.

Duc Doan, **D.H. Jeong**, Designing a Feature Selection Technique to Support Multivariate Analysis on Mixed Data, International Conference on Computing and Technology, 2017.

Dong Hyun Jeong, Ph.D.
Associate Professor of Computer Science

Areas of Expertise

- Human-computer interaction
- Visual analytics
- Information visualization
- Cloud computing

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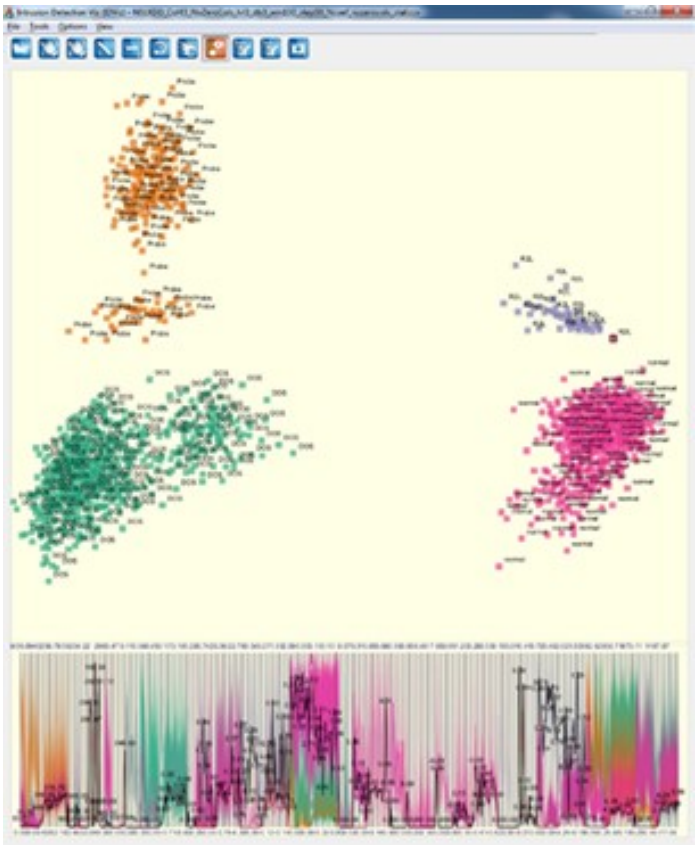
D.H. Jeong, B.-K. Jeong and S.Y. Ji, Designing a Hybrid Approach with Computational Analysis and Visual Analytics to Detect Network Intrusions,The 7th IEEE Annual Computing and Communication Workshop and Conference, pp.1-7, 2017.



A designed intrusion detection analysis tool that consists of two views - Projection view (top) and Data view (bottom). Network traffic activities in the NSL-KDD dataset are mapped with different color attributes as DoS (green), Probe (brown), R2L (purple), and Normal (red).

Book Chapter

S.Y. Ji, K. Najarian, T. Huynh, **D.H. Jeong**, An Integration of Decision Tree and Visual Analysis to Analyze Intracranial Pressure, Neuroproteomics: Methods and Protocols, 405-419, May 2017.

Dr. Thabet Kacem

Peer-Reviewed Papers and Conference Presentations

Thabet Kacem, Alexandre Barreto, Paulo Costa, and Duminda Wijesekera. "Extending ADS-B for Mixed Urban Air Traffic." In 2018 IEEE/AIAA 37th Digital Avionics Systems Conference (DASC), pp. 1-6. IEEE, 2018.

Thabet Kacem, Duminda Wijesekera, and Paulo Costa. "ADS-Bsec: A Holistic Framework to Secure ADS-B." IEEE Transactions on Intelligent Vehicles 3, no. 4 (2018): 511-521.

Kacem, Thabet, Alexandre Barreto, Duminda Wijesekera, and Paulo Costa. "ADS-Bsec: A novel framework to secure ADS-B." *ICT Express* 3, no. 4 (2017): 160-163.

Kacem, Thabet, Wijesekera, Duminda and Costa, Paulo, "Key distribution scheme for aircraft equipped with secure ADS-B IN". In *2017 IEEE 20th International Conference on Intelligent Transportation Systems (ITSC)* (pp. 1-6), October 2017, London, UK.

Thabet Kacem, Ph.D.
Assistant Professor of Computer Science

Areas of Expertise
- Cybersecurity
- Smart transportation systems
- Software-defined radios/radars
- Cyber physical systems
- Sea level rise

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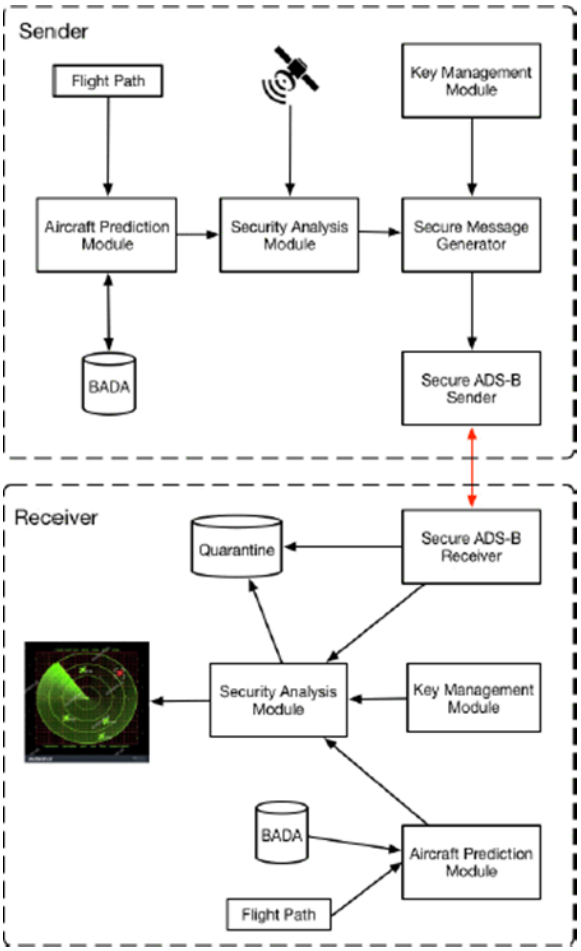

Overview of ADS-Bsec Framework

Dr. Kate Klein

Peer-Reviewed Papers and Conference Presentations

Pawan Tyagi, Tobias Goulet, Christopher Riso, **Kate Klein**, and Francisco Garcia Moreno. "Scanning Electron Microscopy and Optical Profilometry of Electropolished Additively Manufactured 316 Steel Components". ASME 2018 International Mechanical Engineering Congress and Exposition, Vol 2 (doi:10.1115/IMECE2018-88339), November 2018.

K.L. Klein, L. Barner, A.E. Vladar. "Direct-write Method for Machining Fluidic Structures with Helium Ions". Electron, Ion, Photon Beam and Nanotechnology (EIPBN) Conference, May 2017.

J.R. Wilson, **K.L. Klein,** L. Barner, and A.E. Vladar. "Characterization of Helium-Ion Machined Fluidic Structures". Electron, Ion, Photon Beam and Nanotechnology (EIPBN) Conference, May 2018.

Kate Klein, Ph.D.
Associate Professor of Mechanical Engineering

Areas of Expertise

- Nanomaterials synthesis & characterization
- Microscopy
- Electron and ion beam applications
- In-situ experimentation
- Mechanical properties of materials

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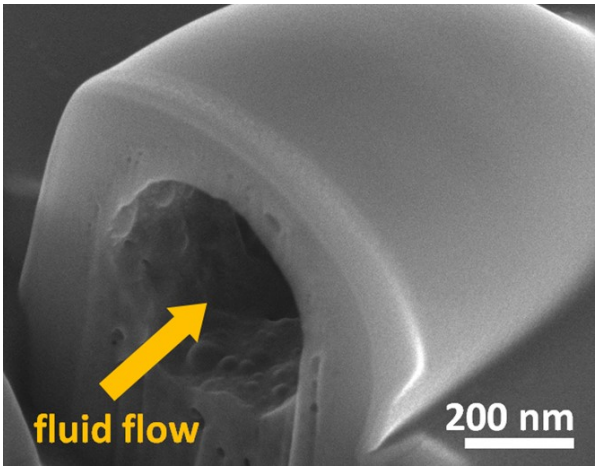
a)



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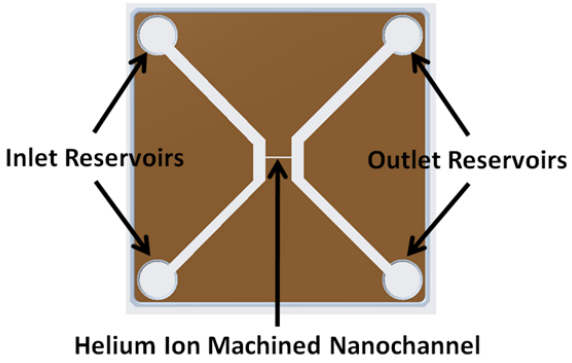
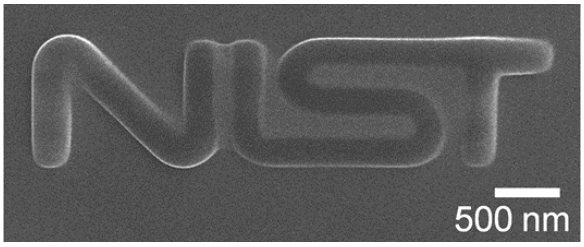


c)



The Orion helium ion microscope, with a typical probe size of less than 1 nm, offers a unique capability for nanofabrication at a scale currently unattainable by conventional gallium-based focused ion beam (FIB) processing. We have developed new methods for producing complex fluidic structures (a), via a direct -write process, which may previously have been too difficult or tedious to produce using multi-step processes, thereby enabling rapid prototyping. Here we demonstrate the novel machining capabilities of the helium ion microscope in order to create a nanochannel device (b). Virtually any pipe geometry (c) can be produced using this technique. This work may lead to the acceleration of novel application discovery in energy, health diagnostics, or lab-on-a-chip microfluidics.

Dr. Lily R. Liang

Peer-Reviewed Papers and Conference Presentations

Lily R. Liang, "Motivating Students with Classroom Honor Roll," 2018 ASEE Mid-Atlantic Spring Conference, Washington, D.C., April 6, 2018.

Teaching Philosophy for Enhanced Learning

Dr. Liang's research focuses on developing various artificial intelligence techniques to discover patterns and make predictions, particularly on digital image data and biomedical data. Her most recent research topics include deep learning for tumor classification, image generation and image captioning.

Lily R. Liang, Ph.D.
Professor of Computer Science

Areas of Expertise

- Digital image processing
- Artificial intelligence
- Bioinformatics
- Data mining

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Dr. Timothy Oladunni

Peer-Reviewed Papers and Conference Presentations

Timothy Oladunni, Sharad Sharma, Raymond Tiwang "A Spatio-Temporal Hedonic House Regression Model" Proceedings of the 16th IEEE International Conference on Machine Learning and Applications, Cancun, Mexico, DOI 10.1109/ ICMLA.2017.00-94, pp. 607 - 612, December 18-21, 2017.

Timothy Oladunni, Sharad Sharma, Raymond Tiwang "Foreclosure Sale and House Value: Correlation or Causation?" Proceedings of the 16th IEEE International Conference on Machine Learning and Applications, Cancun, Mexico, DOI 10.1109/ ICMLA.2017.00-94, pp. 607 - 612, December 18-21, 2017.

Timothy Oladunni, Sharad Sharma, "An Occam's Razor Approach to Hedonic Pricing Theory" Proceedings of the 4th IEEE International Conference on Computational Science and Computational Intelligence (CSCI17), Las Vegas, USA, December 14-16, 2017.

Timothy Oladunni, Ph.D.
Assistant Professor of Computer Science

Areas of Expertise

- Data analysis
- Pattern recognition
- Software engineering
- Deep learning
- Business intelligence
- Data mining

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Dr. Esther Ososanya

Peer-Reviewed Papers and Conference Presentations

Hongmei Dang, **Esther Ososanya**, Nian Zhang, Xiaohui Wang, Hojjatollah Sarvari and Vijay P. Singh, "Numerical Modeling Effect of Defects on Efficiency of Nanowire CdS-CdTe Solar Cells". 2017 IEEE PVSC-44 June 25-30, 2017 Washington, D.C.

Hongmei Dang, **Esther Ososanya**, Nian Zhang, Vijay Singh, "Numerical Modeling and Simulation of Stable Nanowire CdS-CdTe Solar Cells," 17th IEEE International Conference on Nanotechnology (IEEE NANO 2017), Pittsburgh, PA, July 25-28, 2017.

Hongmei Dang, **Esther Ososanya**, Nian Zhang and Vijay Singh, "Numerical Modeling and Simulation of Stable Nanowire CdS-CdTe Solar Cells", 17th IEEE Nanotechnology Conference.

Esther Ososanya, Ph.D.
Professor of Electrical Engineering

Areas of Expertise

- Microcomputer architecture
- VLSI & ASIC designs
- Embedded systems
- Nanotechnology
- Renewable energy

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Dr. Amir Shahirinia

Peer-Reviewed Papers and Conference Presentations

M.R.Baghayipour, A.Hajizadeh, **A.H.Shahirinia**, Z.Chen, "Dynamic Placement Analysis of Wind Power Generation Units in Distribution Power Systems", International Journal of Energies, 11(9), 2326, 2018.

B.Azimian, A.Helmzadeh, **A.H.Shahirinia**, "Minimization of Ohmic Losses in Power Networks by Utilization of Interphase Power Controllers", IEEE International Conference on North American Power Symposium (NAPS), North Dakota, USA, 9-11 Sep. 2018.

P.Mohammadi, B.Azimian, **A.H.Shahirinia**, "A Novel Double-Loop Control Structure Based onFuzzy-PI and Fuzzy-PR Strategies for Single-Phase Inverter in Photovoltaic Application", IEEE International Conference on North American Power Symposium (NAPS), North Dakota, USA, 9-11 Sep. 2018.

A.H.Shahirinia, A.Hajizadeh, D.C.Yu, "Bayesian Predictive Models for Rayleigh Wind Speed", 17th edition of the IEEE International Conference on Ubiquitous Wireless Broadband ICUWB'2017, Salamanca, Spain, 12-15 Sep. 2017.

A.H.Shahirinia, A.Hajizadeh, D.C.Yu, "Bayesian Predictive Models for Weibull Wind Speed", 17th edition of the IEEE International Conference on Ubiquitous Wireless Broadband ICUWB'2017, Salamanca, Spain, 12-15 Sep. 2017.

A.H.Shahirinia, A.Hajizadeh, D.C.Yu, "Bayesian Predictive Models of Economic Dispatching for Wind-Penetrated Power Systems", 17th edition of the IEEE International Conference on Ubiquitous Wireless Broadband ICUWB'2017, Salamanca, Spain, 12-15 Sep. 2017.

A.H.Shahirinia, A.Hajizadeh, "Model Predictive Control of Grid Connected Modular Multilevel Converter for Integration of Photovoltaic Power Systems", 44th International IEEE Photovoltaic Specialists Conference, Washington, DC., USA, 25-30 Jun. 2017.

Amir Shahirinia, Ph.D.
Assistant Professor of Electrical Engineering

Areas of Expertise
- Power systems integration of renewable energy and control
- Bayesian statistical analysis & predictive modelling

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Dr. Devdas Shetty

Peer-Reviewed Papers and Conference Presentations

"Strategies for Robust Mechatronics Systems: using (1) Mechatronic Instructional Platform (2) Web based virtual experimentation" **Shetty**, Pruthviraj and Gangadharan 2017 International Mechanical Engineering Congress and Exposition, IMECE2017 Nov, Tampa, Florida, USA.

"Design for Disassembly as a sustainable product evaluation method" **Shetty, D.,** and Xu, Jiajun, International Mechanical Engineering Congress, IMECE2017 Nov, 2017, Tampa, Florida, USA.

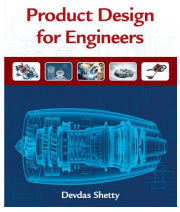
Implementation of Student Presentation-based Learning Approach in Engineering Curriculum' by Xu, J and **Shetty D**, Journal of Engineering Education Transformation, 2018, V 31, ISSN 2349-2473.

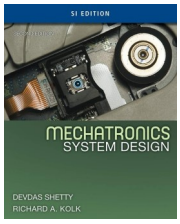
Zhang, Nian and **Shetty, Devdas**, "An Effective LS-SVM Based Approach for Surface Roughness Prediction in Machined Surfaces" Journal of Neuro-computing, NEUCOM-D-15-01001R1, Elsevier, 2016.

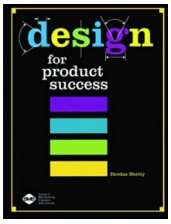
Tyagi, Goulet, Chuenprateep, Stephenson, Knott, Reddick, **Shetty** et.al "Chemical Polishing based surface finishing of 3D printed Steel components" International Mechanical Engineering Congress, IMECE-88378, 9-15 Nov, 2018, Pittsburg, PA, USA.

Book

Shetty, D., Product Design for Engineers, International Edition by Cengage Learning Publications, Ohio, USA ISBN: 978-1-133-96204-5, 2017.







Lara Thompson, Jelani Guise, Pablo Sanchez Guerrero, **Devdas Shetty** et.al " Exploring Training Methodologies Towards the Improvement of Elderly Balance" International Mechanical Engineering Congress, IMECE-86815, 9-15 Nov, 2018, Pittsburg, PA, USA.

Lara Thompson, Jiajun Xu, and **Devdas Shetty** "Devices to Aid Mobility: Biomedical Engineering focused Undergraduate Senior Projects" IMECE-86826 International Mechanical Engineering Congress, IMECE-86826, 9-15 Nov, 2018, Pittsburg, PA, USA,

Devdas Shetty and Jiajun Xu, "Strategies to address Design Thinking in Engineering Curriculum" IMECE-87816, International Mechanical Engineering Congress, IMECE2018, 9-15 Nov, 2018, Pittsburg, PA, USA.

Devdas Shetty and Pawan Tyagi, "Emerging Trends in the Measurement of Engineering Surfaces In Aerospace and Weapons System from Rough to Nano-measurement Range" IMECE-89983, International Mechanical Engineering Congress, IMECE2018, 9-15 Nov, 2018, Pittsburg, PA, USA.

Devdas Shetty, Ph.D., P.E.
Dean and Professor of Mechanical Engineering

Areas of Expertise

- Smart manufacturing
- Design for mechatronics
- Rehabilitation products
- Robotics
- Surface roughness

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Dr. Lara Thompson

Peer-Reviewed Papers and Conference Presentations

Thompson LA. *Age-related Control of Posture & Gait: Exploring Assistive Methodologies towards Improving Elderly Balance.* International Posture Symposium: Parkinson's disease and Ageing. Smolenice, Slovakia, 2018.

Thompson LA. *Sensorimotor Integration in Primates with Vestibular Dysfunction & Applicability to Human Postural Control.* International Posture Symposium: Sensory Integration. Smolenice, Slovakia, 2018.

Thompson LA, Badache M, Brusamolin JAR, Guise J, Behera L, Estrada SC, Savadkoohi M, Guerrero PS, Shetty D. *Exploring Training Methodologies Towards the Improvement of Elderly Balance*. American Society of Mechanical Engineering Proceedings. ASME. 52026 (3): Biomedical and Biotechnology Engineering, V003T04A038, IMECE2018-86815, 2018. doi:10.1115/IMECE2018-86815.

Thompson LA, Xu J, Shetty D. *Devices to Aid Mobility: Biomedical Engineering-focused Undergraduate Senior Capstone Design Projects*. American Society of Mechanical Engineering Proceedings. ASME. 52064(5): Engineering Education, V005T07A048. IMECE2018-86826, 2018. doi:10.1115/IMECE2018-86826.

Thompson LA, Haburcakova C, Lewis RF. *A distinctive platform-system to study the effects of a vestibular prosthesis on non-human primate postural control.* Journal of Engineering and Science in Medical Diagnostics and Therapy, 1(2), 021004, JESMDT-17-2038, 2018. doi: 10.1115/1.4039140.

Thompson LA, Haburcakova C, Goodworth AD, Lewis RF. *An Engineering Model to Test for Sensory Reweighting: Nonhuman Primates Serve as a Model for Human Postural Control and Vestibular Dysfunction.* Journal of Biomechanical Engineering, 140(1), BIO-16-1532, 2018. doi: 10.1115/1.4038157.

Thompson LA, Badache M, Cale S, Behera L, Zhang N. *Balance performance as observed by center-of-pressure parameter characteristics in male soccer athletes and non-athletes*. Sports 2017, *5*(4), 86. doi:10.3390/sports5040086.

Behera L, **Thompson LA**. *Exploring Force-Exertion of a Robotic, Prosthetic Hand for Common Hand Gestures.* NSF Emerging Researchers National Conference (ERN) in STEM, 2017.

Zhang NA, Xiong J, Zhong J, **Thompson LA**, Ying H**.** *An Enhanced K-Nearest Neighbor Classification Method Based on Maximal Coherence and Validity Ratings*. Advances in Neural Networks ISNN 2017, F. Cong et al. (Eds.): ISSN 2017, Part I, LNCS 10261, pp.206-204, 2017.

Haburcakova C, Merfeld D, Gong W, Guinand N, Perez Fornos A, **Thompson LA**, Guyot JP, Lewis RF. *Sensory prosthetics - clinical and scientific utility of a vestibular implant.* Neurology, 88 (16), Supplement S26.002, 2017.

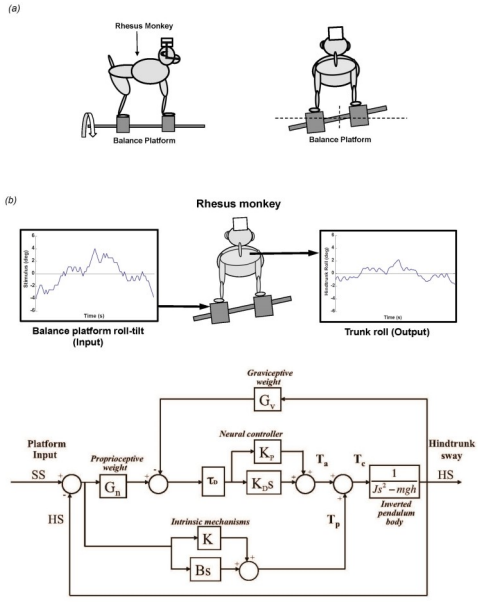
Baker C, Brent D, Wilson C, Xu J, **Thompson LA**. *Additive Manufacturing for Economical, User-accessible Upper-limb Prosthetics.* Prosthetics and Orthotics Open Journal, 1:8, 2017.

Thompson LA, Haburcakova C, Lewis R. *Postural compensation strategy depends on the severity of vestibular damage.* Heliyon, 3(3), e00270, 2017. doi: 10.1016/j.heliyon.2017.e00270.

Thompson LA, Haburcakova C, Lewis RF. *A novel platform-system to study the effects of a vestibular prosthesis on non-human primate postural control.* American Society of Mechanical Engineering Proceedings. ASME. 58363(3): Biomedical and Biotechnology Engineering, V003T04A075, IMECE2017-70724, 2017. doi: 10.1115/IMECE2017-70724.

Faculty Members and Peer-Reviewed Papers and Conference Presentations 2017-2018

Badache M, Behera L, Zhang N, **Thompson LA**. *Investigating female athletes' balance using center-of-pressure (COP) derived displacement and velocity parameters.* American Society of Mechanical Engineering Proceedings. ASME. 58363(3): Biomedical and Biotechnology Engineering, V003T04A065, IMECE2017-70730, 2017. doi: 10.1115/IMECE2017-70730



Vestibular-focused, Non-Human Primate Balance Research: *Top)* (a) Schematic of pseudorandom roll-tilt test setup and (b) PRTS balance platform input (left), animal (middle), and trunk roll output (right); *Bottom)* Sensory Integration Feedback Controller Model

Mature and Elderly Human Balance Research: NaviGAITor partial bodyweight support system

Chairless Chair Exoskeleton

Lara Thompson, Ph.D.
Associate Professor of Mechanical Engineering

Areas of Expertise

- Postural control and mobility
- Non-invasive and invasive prostheses
- Sensory substitutes
- Rehabilitative devices

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Dr. Pawan Tyagi

Peer-Reviewed Papers and Conference Presentations

P. Tyagi, T. Goulet, C. Riso, and F. Garcia-Moreno, "Reducing Surface Roughness By Chemical Polishing Of Additively Manufactured 3D Printed 316 Stainless Steel Components," The International Journal of Advanced Manufacturing Technology, pp. 1-6, 2018.

P. Tyagi and T. Goulet, "Nanoscale Tantalum Layer Impacting Magnetic Properties Of Tunnel Junction-Based Molecular Devices," MRS Comm., pp. 1-5, 2018.

P. Tyagi and E. Friebe, "Large Resistance Change on Magnetic Tunnel Junction based Molecular Spintronics Devices," J. Mag. Mag. Mat., vol. 453, pp. 186-192, 2018.

P. Tyagi, "Surface Passivation with Sulfide and Fluoride Ions," MRS Advances, vol. 2, pp. 2915-2920, 2017.

M. Thomas, **P. Tyagi**, C. Moore, and P. Hampton-Garland, "Student Presentation Based Effective Teaching (SPET) Approach for Advanced Courses," American Research Journal of Humanities and Social Sciences, vol. 3, pp. 2378-7031, 2017.

P. Tyagi, E. Friebe, B. Jacquis, T. Goulet, S. Travers, and F. Garcia Moreno, "Taguchi Design of Experiment Enabling the Reduction of Spikes on the Sides of Patterned Thin Films for Tunnel Junction Fabrication," MRS Advances, vol. 2, pp. 3025-3030, 2017.

P. Tyagi, T. Goulet, D. Brent, K. Klein, and F. Garcia-Moreno, "Scanning Electron Microscopy and Optical Profilometry of Electropolished Additively Manufactured 316 Steel Components," ASME-IMECE-2018 Proceedings, vol. Volume 2: Advanced Manufacturing, p. V002T02A019, 2018.

P. Tyagi, "Student Presentation Based Teaching (SPET) Approach for Classes With Higher Enrollment," presented at the ASME 2018 International Mechanical Engineering Congress and Exposition, Pittsburgh, Pennsylvania, USA, 2018.

Pawan Tyagi, Ph.D.
Associate Professor of Mechanical Engineering

Areas of Expertise
- Molecular spintronics
- Additive manufacturing and postprocessing
- Spin photovoltaic cells and solar thermal air heaters
- Nano biosensors and brain imaging
- Student presentation based effective Teaching (SPET)

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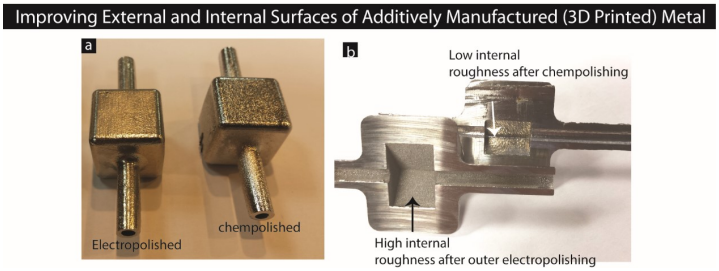

Metal 3D printed samples with internal and external surface after electropolishing and chemical polishing (a) Externally and (b) Internally (b) (Published in: Tyagi et al. Additive Manufacturing, 2018)

Faculty Members and Peer-Reviewed Papers and Conference Presentations
2017-2018

Dr. Lei Wang

Peer-Reviewed Papers and Conference Presentations

Shi, L., Zhang, B., **Wang, L.**, Wang, H., Zhang, H. (2018). Functional efficiency assessment of the water curtain system in an underground water-sealed oil storage cavern based on time-series monitoring data. Engineering Geology, 239, 79-95.

Hu, J. Z., Zhang, J., and **Wang, L.** (2018). "Assessing site investigation program for serviceability design of shallow foundations on spatially variable soil." Proceedings of the 6th International Symposium on Reliability Engineering and Risk Management (6ISRERM), Singapore, pp. 131-136.

Gong, W., Juang, C.H., Tang, H., and **Wang, L.** (2018). Probabilistic Slope Stability Analysis with Subdomain Sampling Method. Proceedings of the 6th International Symposium on Reliability Engineering and Risk Management (ISRERM 2018), Singapore, pp. 105-111.

Wang, L., Powers, M., and Gong, W. (2017). "Reliability Analysis of Geosynthetic Reinforced Soil Walls." Geo-Risk 2017: Geotechnical Risk from Theory to Practice, ASCE Geotechnical Special Publication 285, pp. 91-100.

Gong, W., Martin, J.R., Juang, C.H., and **Wang, L.** (2017). "Site Characterization in Geotechnical Engineering - Does A Random Field Model Always Outperform A Random Variable Model?" Geo-Risk 2017: Geotechnical Risk from Theory to Practice, ASCE Geotechnical Special Publication 285, pp. 477 -486.

Wang, L., Smith, N., Khoshnevisan, S., Luo, Z., and Juang, C.H. (2017). "Reliability-Based Geotechnical Design of Geothermal Foundations." Geotechnical Frontiers 2017, ASCE Geotechnical Special Publication (GSP 280), pp. 124-132.

Wang, L., and Zeytinci, A. (2017). "Enhance the Effectiveness of Teaching Geotechnical Engineering Courses using Various Design and Analysis Programs." ASEE Middle Atlantic Spring 2017 Conference, Paper ID 20835, pp. 1-7.

Khoshnevisan, S., **Wang, L.**, and Juang, C. H. (2017). "Response surface-based robust geotechnical design of supported excavation–spreadsheet-based solution." Georisk: Assessment and Management of Risk for Engineered Systems and Geohazards, 11(1), 90-102.

Sandae Tait, **Lei Wang** (2018). Risk Assessment of Earthen Levee in Face of Multi Hazards, 2018 Annual Summer Research Symposium for Louis Stokes Alliance for Minority Participation Program, Virginia State University, Petersburg, VA, July 2018.

Sandae Tait, Ji Shin, **Lei Wang** (2018). Develop a Novel Geotechnical Design Tool for Geosynthetic Reinforced Soil Structure based on Reliable and Numerical Methods, National Institute of Science Conference (75th Joint Meeting BKX and NIS), Clinton, MD, April 2018.

Wang, L., Powers, M., Studiner, M., Fallatah, M., and Gong, W. (2018). "Geotechnical Stability Analysis of Earthen Levees in the Face of Uncertainty." Proceedings of the International Foundation Congress and Equipment Expo (IFCEE) 2018, ASCE Geotechnical Special Publication 297, pp. 247-256.

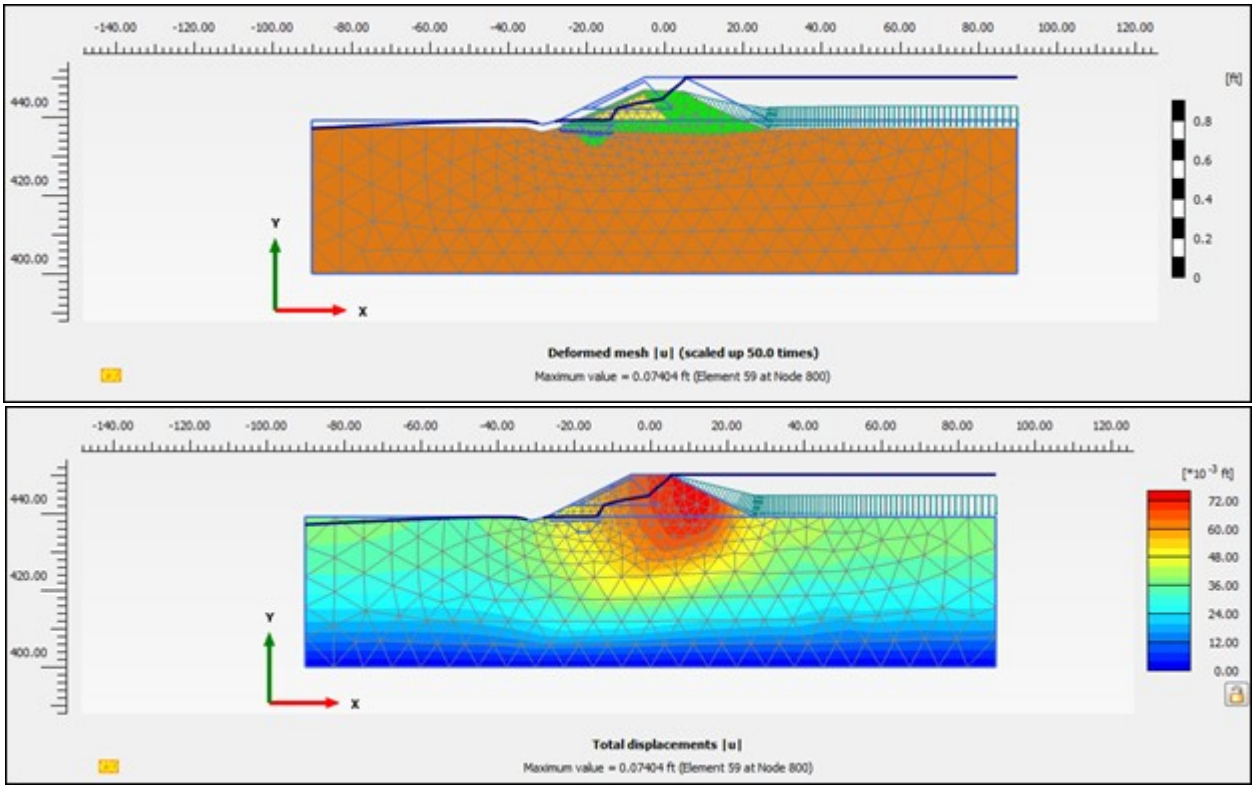

Figure 3. Finite element model for the earthen levee and its displacement under loading.

Lei Wang, Ph.D., P.E.
Assistant Professor of Civil Engineering

Areas of Expertise
- Geotechnical risk and reliability
- Design of resilient infrastructure
- Sustainable concrete materials
- Tunnels and supported excavations
- Foundations and reinforced soil structures
- Geotechnical earthquake engineering

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Faculty Members and Peer-Reviewed Papers and Conference Presentations
2017-2018

Dr. Jiajun Xu

Peer-Reviewed Papers and Conference Presentations

Jiajun Xu, Jaime Rios**, "**Design and Test of a Direct -Metal-Laser-Sintering (DMLS) Fabricated Micro-Channel Heat Exchanger for Advanced Cooling", ASME 4th Thermal and Fluids Engineering Conference (TFEC), April 14–17, 2019 Las Vegas, NV, USA.

Jiajun Xu, Devdas Shetty, Abiose Adebayo**, "**Undergraduate Active Learning Experience through Industrial Sponsored Capstone Projects on Thermal-Fluids Science", ASME 4th Thermal and Fluids Engineering Conference (TFEC), April 14–17, 2019 Las Vegas, NV, USA.

Lara Thompson, **Jiajun Xu**, Devdas Shetty, "Devices to Aid Mobility: Biomedical Engineering Focused Undergraduate Senior Capstone Design Projects", ASME *International Mechanical Engineering Congress and Exposition*, Nov 3-9, 2017, Pittsburg, PA, USA.

Jiajun Xu, Sasan Haghani, "Experiential Learning in STEM at the University of the District of Columbia (UDC) Through the Implementation of the First UDC Firebird Rover for the NASA Human Exploration Rover Challenge", ASME *International Mechanical Engineering Congress and Exposition*, Nov 3-9, 2017, Pittsburg, PA, USA.

Devdas Shetty, **Jiajun Xu,** "Strategies to Address "Design Thinking" in Engineering Curriculum", ASME *International Mechanical Engineering Congress and Exposition*, Nov 3-9, 2017, Pittsburg, PA, USA.

Pawan Tyagi, Morris Thomas, Carl Moore, Pamela Hampton-Garland, **Jiajun Xu**, Lara Thompson, Sasan Haghani, "Experience of Multiple Instructors About Student Presentation Based Teaching (SPET) Approach", ASME *International Mechanical Engineering Congress and Exposition*, Nov 3-9, 2017, Pittsburg, PA, USA.

Jiajun Xu, Musa Acar, Naresh Poudel, Jaime Rios, Thanh N Tran, "A numerical study of flow boiling heat transfer of nanoemulsion in mini-channel heat exchanger", *ASME 2018 5th Joint US-European Fluids Engineering Summer Conference*, July 15-20, 2018, Montreal, Quebec, Canada.

Jiajun Xu, James McLaurin, Cyree Beckett, "Nucleate boiling heat transfer and bubble dynamics of water-in-polyalphaolefin nanoemulsion", *ASME 2018 5th Joint US-European Fluids Engineering Summer Conference*, July 15-20, 2018, Montreal, Quebec, Canada.

Jiajun Xu, Trinh Vu, Thanh N. Tran, "Single-phase flow and heat transfer characteristics of ethanol/ polyalphaolefin nanoemulsion fluids in circular minichannels", *International Journal of Heat and Mass Transfer*, Volume 113, 2017, Pages 324-331.

Jiajun Xu, Trinh Vu, "An Experimental Study on Flow and Heat Transfer Characteristics of Ethanol/ Polyalphaolefin Nanoemulsion Flowing Through Circular Minichannels", *Nanoscale Research Letters* (2017) 12: 216.

Jiajun Xu, Trinh Vu, Tolessa Deksissa, "Development and characterization of a hybrid mesoporous material infused with metallic oxide nanoparticles for water treatment", *Nanomaterials and Nanotechnology*, Volume 7: 1–8, 2017.

Trinh Vu, Highqueen Sarpomah, Michael Kamen, Tolessa Deksissa, **Jiajun Xu**, "Nanoparticles Infused Mesoporous Material for Water Treatment Processes", ASME *International Mechanical Engineering Congress and Exposition*, Nov 3-9, 2017, Tampa, FL, USA.

Faculty Members and Peer-Reviewed Papers and Conference Presentations 2017-2018

Devdas Shetty, **Jiajun Xu**, "Design for Disassembly as Sustainable Product Evaluation Method – Example of Underground Escalator", *ASME International Mechanical Engineering Congress and Exposition*, Nov 3-9, 2017, Tampa, FL, USA.

Robert Stephenson, **Jiajun Xu**, "Synchronized High-Speed Video and Infrared Thermometry Study of Bubble Dynamics during Nucleate Boiling of Nanoemulsion", *ASME 2017 Summer Heat Transfer Conference*, July 9-14, 2017, Bellevue, Washington, USA.

Fana Zewede, Henok Argaw, Thanh Tran, **Jiajun Xu**, "Convective Heat Transfer of Ethanol/ Polyalphaolefin Nanoemulsion inside Circular Minichannel Heat Exchanger", *ASME 2017 Summer Heat Transfer Conference*, July 9-14, 2017, Bellevue, Washington, USA.

Jiajun Xu, Christopher Hendricks, "A multiphysics simulation of the thermal runaway in large-format lithium-ion batteries", The Intersociety Conference on Thermal and Thermomechanical Phenomena in Electronic Systems, 5/28-31, 2019 Las Vegas, NV.

Jiajun Xu, Jaime Rios, "An Experimental Study of Single-phase Heat Transfer inside an Additively Fabricated Microchannel Heat Exchanger", The Intersociety Conference on Thermal and Thermomechanical Phenomena in Electronic Systems, 5/28-31, 2019 Las Vegas, NV, USA.

Jiajun Xu, Trihn Vu, Highqueen Sarpoma, Michael kamen, Tolessa Deksissa, "Nanoparticles Infused Mesoporous Material for Water Treatment Processes", Annual Water Resources Conference hosted by Universities Council on Water Resources (UCOWR) & National institutes of Water Resources (NIWR), June 26-28, 2018, Pittsburgh, PA.

Jiajun Xu, Michael Kamen, Tolessa Dekissa, "Assessment and Characterization of Hybrid Mesoporous Material with Performance of Infiltration basins", 2018 Summer Specialty Conference: The Science, Management and Governance of Transboundary Groundwater, hosted by American Water Resources Association (AWRA), July 9-11, 2018, Fort Worth, TX.

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Areas of Expertise

- Multiscale thermal transport and energy conversion
- Multiscale modeling and simulation
- Thermal-fluid science
- Nanotechnology
- Renewable energy and water treatment
- Additive manufacturing

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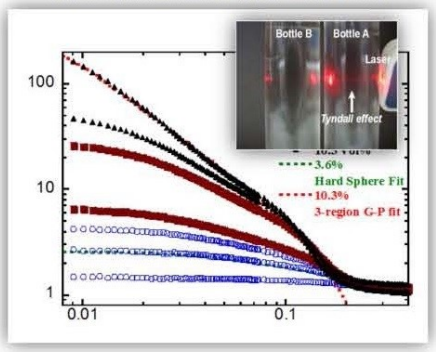
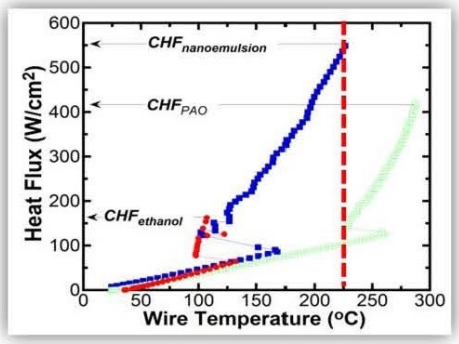
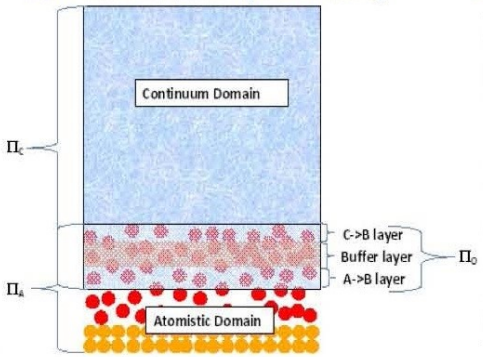
Nanostructured Heat Transfer Fluid



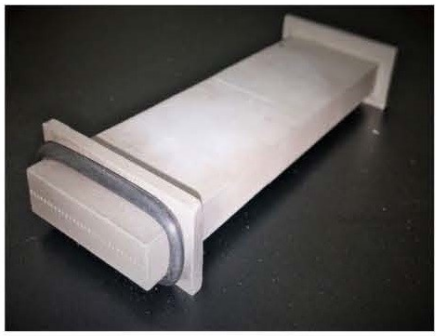
Over 400% Increase in CHF



Multi-Scale and Multi-Physics Modeling



3D Printed Metal Microchannel Heat Exchanger



Dr. Ahmet Zeytinci

Peer-Reviewed Papers and Conference Presentations

A. T. Olasumboye, G. M. Owolabi, A. G. Odeshi, N. Yilmaz, **A. Zeytinci**, "Dynamic Behavior of AA2519 -T8 Aluminum Alloy under High Strain Rate Loading in Compression," *Journal of Dynamic Behavior of Materials,* pp. 1-11, 2018.

A. Olasumboye, G. Owolabi, A. Odeshi, **A. Zeytinci**, N. Yilmaz, "Dynamic Response and Microstructure Evolution of AA2219-T4 and AA2219-T6 Aluminum Allows," *Journal of Dynamic Behavior of Materials*, pp. 1-17, 2018.

G. M. Owolabi, D. T. Bolling, A. G. Odeshi, H. A. Whitworth, N. Yilmaz, **A. Zeytinci**, "The Effects of Specimen Geometry on the Plastic Deformation of AA 2219-T8 Aluminum Alloy Under Dynamic Impact Loading," *Journal of Materials Engineering and Performance*, Vol. 26, No. 12, pp. 5837-5846, 2017.

G. M. Owolabi, T. Daramola, N. Yilmaz, H. A. Whitworth, **A. Zeytinci**, "Mechanical Properties of Ultrafine Grain 2519 Aluminum Alloy," TMS Annual Meeting and Exhibition, pp. 943-950, 2018.

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American Society of Civil Engineers / National Capital Section Monthly Newsletter Articles, Problems and Applications

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Plus 30-50 Original Problems, Solutions and Applications

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New Specifications for Structural Engineering SE Exams: Part-II
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Reflecting on 2016: Remembrance of Dmitri T. Clemons
Plus 30-50 Problems, Solutions and Applications

Dr. Nian Zhang

Peer-Reviewed Papers and Conference Presentations

Wenbing Zhao, Qing Wu, Ann Reinthal, and **Nian Zhang**, "Design, Implementation, and Field Testing of a Privacy-Aware Compliance Tracking System for Bedside Care in Nursing Homes," Applied System Innovation, Special Issue: Healthcare System Innovation, vol. 1, issue. 1, no. 3, 2018.

Alicia Marshall, Keenan Leatham, Ever Guevara,Devan Newman, Esther Ososanya, and **Nian Zhang**, "Feature Extraction Using Principal Component Analysis (PCA) Clustering Algorithm in an Virtual Reality Environment," *2018 ASEE Mid-Atlantic Spring Conference,* University of the District of Columbia, Washington, D.C., April 6-7, 2018.

Welezane Karimoune, **Nian Zhang** and Esther Ososanya, "Development of a Article Swarm Optimization Based Imbalanced Evolving Self-Organizing Learning Algorithm", *75th NIS/BKX Joint Annual Meeting*, Clinton, Maryland, March 21-24, 2018.

Saul Henderson, Keenan Leatham, **Nian Zhang** and Lara Thompson, "Development of a Novel Semi-Supervised Based Kernel Density Clustering Algorithm", *2018 Emerging Researchers National (ERN) Conference in STEM*, Washington, D.C., February 22-24, 2018.

Messan Anato, Devan Newman, **Nian Zhang**, and Lara Thompson, "Performance Study of Mining and Forecasting of Big Time Series Data," *2018 Emerging Researchers National (ERN) Conference in STEM*, Washington, D.C., February 22-24, 2018.

Keenan Leatham, Saul Henderson, **Nian Zhang** and Lara Thompson, "Development of a Hybrid Particle Swarm Optimization (PSO) and Evolutional Algorithm (EA) Based Feature Selection Algorithm with LS-SVM Classifier," *2018 Emerging Researchers National (ERN) Conference in STEM*, Washington, D.C., February 22-24, 2018.

Nian Zhang and Keenan Leatham, "Feature Selection Based on SVM in Photo-Thermal Infrared (IR) Imaging Spectroscopy Classification with Limited Training Samples", *WSEAS Transactions on Signal Processing*, ISSN / E-ISSN: 1790-5052 / 2224-3488, vol. 13, 2017, Art. #33, pp. 285-292.

Nian Zhang, Tam Le, Sasan Haghani, "Design and Implementation of FPGA Based LMS Self-Adjusting Adaptive Filtering System for Audio Signal Processing," *WSEAS Transactions on Signal Processing*, ISSN / E-ISSN: 1790-5052 / 2224-3488, vol. 13, Art. #29, pp. 256-263, 2017.

Lara A. Thompson, Mehdi Badache, Steven Cale, Lonika Behera, and **Nian Zhang**, "Balance Performance as Observed by Center-of-Pressure Parameter Characteristics in Male Soccer Athletes and Non-Athletes," *Sports*, vol. 5, no. 4, November 2017.

Nian Zhang, Tam Le, Sasan Haghani, "An FPGA Implementation of an LMS Self-Adjusting Adaptive Noise Cancellation System for Audio Processing," *Journal of Circuits and Electronics, vol.* **2**, pp. 43-49, 2017.

Nian Zhang and Keenan Leatham, "Neurodynamics -Based Nonnegative Matrix Factorization for Classification", *The 25th International Conference on Neural Information Processing (ICONIP)*, Siem Reap, Cambodia, December 13-16, 2018.

Nian Zhang, Jiang Xiong, Jing Zhong, and Keenan Leatham, "PCA-K-means Based Clustering Algorithm for High Dimensional and Overlapping Spectra Signals", *The Ninth International Conference on Intelligent Control and Information Processing (ICICIP)*, Wanzhou, China, November 9-11, 2018.

Faculty Members and Peer-Reviewed Papers and Conference Presentations 2017-2018

Nian Zhang, Jiang Xiong, Jing Zhong, and Keenan Leatham, "Gaussian Process Regression Method for Classification for High-Dimensional Data with Limited Samples", *The 8th International Conference on Information Science and Technology (ICIST 2018)*, Cordoba, Granada, and Seville, Spain, June 30-July 6, 2018.

Nian Zhang, Jiang Xiong, Jing Zhong, and Lara Thompson, "Feature Selection Method Using BPSO-EA with ENN Classifier", *The 8th International Conference on Information Science and Technology (ICIST 2018)*, Cordoba, Granada, and Seville, Spain, June 30-July 6, 2018.

Nian Zhang and Keenan Leatham, "Supervised Feature Selection Method for High-Dimensional Data Classification in Photo-Thermal Infrared Imaging with Limited Training Data", *5th International Conference on Control, Decision and Information Technologies (CoDIT'18)*, Thessaloniki, Greece, 2018.

Mehdi Badache, Lonika Behera, **Nian Zhang**, and Lara Thompson, "Investigating female athletes' balance using center-of-pressure (COP) derived displacement and velocity parameters," *ASME International Mechanical Engineering Congress & Exposition*, November 3-9, 2017.

Nian Zhang, Welezane Karimoune, Lara Thompson, and Hongmei Dang, "A Between-Class Overlapping Coherence-Based Algorithm in KNN Classification," The 2017 IEEE International Conference on Systems, Man, and Cybernetics (SMC2017), Banff, Canada, October 5-8, 2017.2017.

Hongmei Dang, Esther Ososanya, **Nian Zhang**, Vijay Singh, "Numerical Modeling and Simulation of Stable Nanowire CdS-CdTe Solar Cells," *17th IEEE International Conference on Nanotechnology (IEEE NANO 2017)*, Pittsburgh, PA, July 25-28, 2017.

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- Spatio-temporal database
- High-dimensional database
- Indexing
- Data modeling
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