

Blake N. Johnson, Ph.D.

Curriculum Vitae



Virginia Tech
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Research Interests: Biosensing; Sensing; Data-driven Chemical Engineering; Smart Sensing; Autonomous Experimental Chemistry; Biomanufacturing; Additive Manufacturing; Sensors; Biosensors; Smart Manufacturing; Bioprocess Engineering; Surface Functionalization; Sustainable Materials; Bioenergy

Professional Experience

- | | |
|--|----------------|
| Virginia Tech | 2015 – present |
| Associate Professor – Department of Industrial and Systems Engineering (since 2022) | |
| Assistant Professor – Department of Industrial and Systems Engineering (2015 – 2022) | |
| Affiliated Professor – Department of Chemical Engineering | |
| – Department of Materials Science and Engineering | |
| – Department of Biomedical Engineering and Mechanics | |
| – School of Neuroscience | |
| – Macromolecular and Interfaces Institute | |
| – Faculty of Health Sciences | |
| – Interdisciplinary Graduate Education Program for Regenerative Medicine | |
| – Interdisciplinary Graduate Education Program for Computational Tissue Engineering | |
| – Center for Emerging, Zoonotic, and Arthropod-borne Pathogens | |
| Princeton University | 2013 – 2015 |
| Postdoctoral Associate – Department of Mechanical and Aerospace Engineering | |

Education

- | | |
|---|-------------|
| Princeton University | 2013 – 2015 |
| Postdoctoral Associate – Department of Mechanical and Aerospace Engineering | |
| Drexel University | 2008 – 2013 |
| <i>Ph.D.</i> Chemical Engineering | |
| University of Wisconsin - Madison | 2003 – 2008 |
| <i>B.S.</i> Chemical Engineering | |
| <i>Certificate</i> Chemistry | |
| University of Oviedo – Oviedo Spain | 2007 |
| UW-Madison Dept. of Chemical and Biological Eng. Summer Lab | |

Honors and Awards

Major Honors and Awards

- Career Award – [National Science Foundation \(NSF\)](#) (2022)
- Outstanding Young Manufacturing Engineer Award – [Society of Manufacturing Engineers \(SME\)](#) (2020)
- Outstanding Young Investigator Award – [Institute of Industrial and Systems Engineers \(IISE\) Manufacturing and Design Division](#) (2018)
- Innovation Award (2nd Place) – [Princeton University](#) (2015)
- Best Dissertation Award – [Drexel University](#) (2013)

Teaching

- Deans Award for Excellence - White Award for Innovation in Engineering Education – [Virginia Tech](#) (2022)
- Undergraduate Research Advisor Award, Student Engineers' Council – [Virginia Tech](#) (2018)
- Outstanding Teaching Award, Panhellenic Council – [Virginia Tech](#) (2016)

Other

- John Grado Faculty Fellow – [Virginia Tech](#) (2022)
- College of Expert Reviewers – [European Science Foundation \(ESF\)](#) (2020)
- Outstanding New Assistant Professor Award – [Virginia Tech](#) (2018)
- Big Competition Award, Student Engineering Council – [Virginia Tech](#) (2018)
- Chemical Engineering Award – [Drexel University](#) (2012)
- William A. Casey Memorial Scholarship – [Drexel University](#) (2008)
- William F. Vilas Merit Scholarship – [University of Wisconsin-Madison](#) (2003)

Journal Publications

ORCID ID: orcid.org/0000-0003-4668-2011

Google Scholar: <https://scholar.google.com/citations?user=sT6JYBcAAAAJ&hl=en>

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†Co-first authors.

#Undergraduate author

Under Review

- 1) Ezgi Kucukdeger, Xiaoting Jia & **Blake N. Johnson**^{*}, Automated Characterization of Bulk Tissue 3D Spatial Material Properties via Robotically-directed Impedimetric Sensing, *IEEE Transactions on Automation Science and Engineering*
Status: Revision under Preparation

- 2) Andrew Law, Ezgi Kucukdeger, Ted Barron, Jihoon Chung, Rongxuan Wang, Yang Liu, **Blake N. Johnson**, & Zhenyu Kong*, Process Parameter Optimization for Reproducible Fabrication of 3D-printed Tissue Scaffold Porosity and Mechanical Properties, *Journal of Intelligent Manufacturing*
Status: Revision under Preparation

Published

- 1) Ezgi Kucukdeger & **Blake N. Johnson***, Closed-loop Controlled Conformal 3D Printing on Moving Objects via Real-time Object Position Sensing, *Journal of Manufacturing Processes. Accepted*.
- 2) Junru Zhang, Yang Liu, Durga Chandra Sekhar.P, Manjot Singh, Yuxin Tong, Ezgi Kucukdeger, Hu Young Yoon, Maren Roman, Zhenyu (James) Kong & **Blake N. Johnson***, Rapid, Autonomous High-throughput Characterization of Hydrogel Rheological Properties via Automated Sensing and Physics-guided Machine Learning, *Applied Materials Today, Accepted* (2022).
- 3) **Blake N. Johnson***, A sweet solution to complex microprinting, *Science* **378** 826-827 (2022).
- 4) Yang Liu, Keturah Bethal, Junru Zhang, Manjot Singh, Alexander Haring, Rana Ashkar, Eric M. Davis, **Blake N. Johnson***, Comparison of Bulk- vs Layer-by-Layer-Cured Stimuli-Responsive PNIPAM–Alginate Hydrogel Dynamic Viscoelastic Property Response via Embedded Sensors. *ACS Applied Polymer Materials* **4** 5596-5607 (2022).
- 5) Xiang Xu, Xijie Zhou, Jian Du, Liming Qing, Gabsang Lee, **Blake N. Johnson**, & Xiaofeng Jia* Macrophage activation in the dorsal root ganglion promotes autotomy after peripheral nerve. *International Journal of Molecular Sciences* **22** 12801 (2021).
- 6) Ezgi Kucukdeger, Yuxin Tong, Manjot Singh, Junru Zhang, Alejandro Salado, Leon Harding, Steven Ellingson & **Blake N. Johnson***, Conformal 3D Printing of Non-planar Antennas on Wrinkled and Folded Kapton Films using Point Cloud Data. *Flexible and Printed Electronics* **6** 044002 (2021).
- 7) Manjot Singh, Junru Zhang, Keturah Bethal, Yang Liu, Eric Davis, Haibo Zeng, Zhenyu Kong & **Blake N. Johnson***, Closed-loop Controlled Photopolymerization of Hydrogels. *ACS Applied Materials and Interfaces* **13** 40365-40378 (2021)
- 8) Yuxin Tong, Jin Pan, Ezgi Kucukdeger, Ashley L. Johnson, Linsey C. Marr & **Blake N. Johnson***, 3D Printed Mask Frames Improve the Inward Protection Efficiency of a Cloth Mask. *Environmental Science & Technology Engineering* **6** 1000-1008 (2021).
Front Cover
- 9) Yang Zhang, Xiang Xu, Yuxin Tong, Xijie Zhou, Jian Du, Shouwei Yue, Gabsang Lee, **Blake N. Johnson** & Xiaofeng Jia*, Therapeutic Effects of Neural Crest Stem Cells on Pain and Spinal Cord Changes After Sciatic Nerve Transection. *Stem Cell Research & Therapy* **12** 180 (2021).
- 10) Camden A. Chatham, Garrett F. Godshall, Timothy E. Long, Michael J. Bortner, **Blake N. Johnson**, Christopher B. Williams* Interpreting transient temperature profiles for available coalescence time and prediction of mechanical property plateau in powder bed fusion additive manufacturing. *Materials and Design* **201** 109474 (2021).

- 11) Yujing Zhang, Xiyuan Li, Jongwoon Kim, Yuxin Tong, Emily Thompson, Shan Jiang, Ziang Feng, Li Yu, Jinhua Wang, Dong Ha, Harald Sontheimer, **Blake N. Johnson** & Xiaoting Jia*, Thermally Drawn Stretchable Electrical and Optical Fiber Sensors for Multimodal Extreme Deformation Sensing. *Advanced Optical Materials* 2001815 (2020).
- 12) Ellen Cesewski, Manjot Singh, Yang Liu, Junru Zhang, Alexander P. Haring, & **Blake N. Johnson***, Real-time Characterization of Hydrogel Viscoelastic Properties and Gelation Processes Transitions using High-order Modes in Cantilever Sensors. *Journal of Applied Physics* **128** 174502 (2020).
- 13) Garret Burks, Manjot Singh, Raffaella De Vita, **Blake N. Johnson** & Alexander Leonessa*, Effect of Mechanical Properties on the Dynamics of Self-Oscillating Synthetic Vocal Folds. *Journal of Dynamic Systems, Measurement and Control* DS-19-1541 (2020).
- 14) Alexander P. Haring[†], Shan Yuan[†], Katherine Barron, Emily Thompson, Harald Sontheimer, Jia-Qiang He, Xiaoting Jia & **Blake N. Johnson***, 3D bioprinting using hollow multifunctional fiber impedimetric sensors. *Biofabrication* **12** 035026 (2020).
- 15) Yuxin Tong[†], Ziang Feng[†], Jongwoon Kim, John Robertson, Xiaoting Jia* & **Blake N. Johnson***, 3D Printed Multi-functional Fibers. *Nano Energy* 104973 (2020).
- 16) Alexander P. Haring, Manjot Singh, Mihar Koh,[#] Ellen Cesewski, David Dillard, Zhenyu Kong & **Blake N. Johnson***, Real-time Characterization of Hydrogel Viscoelastic Properties and Sol-Gel Phase Transitions using Cantilever Sensors. *Journal of Rheology* **64** 837-850 (2020).
- 17) Ellen Cesewski and **Blake N. Johnson***, Electrochemical Biosensors for Pathogen Detection. *Biosensors and Bioelectronics* **159** 112214 (2020).
 - [Highlights: Ranked Among Most Downloaded Paper from *Biosensors and Bioelectronics* in 2022.](#)
- 18) Alexander P. Haring[†], Emily Thompson[†], Sahil Laheri[#], Raymundo Hernandez, Megan E. Harrigan, Taylor Lear, Harald Sontheimer & **Blake N. Johnson***, 3D Printed Competitive Migration Assays with Spatially-programmable Release Sources. *Advanced Biosystems* **4** 1900225 (2020).
- 19) Yuxin Tong, Ezgi Kucukdeger, Justin Halper, Ellen Cesewski, Elena Karakozoff[#], Alexander P. Haring, David McIlvain[#], Manjot Singh, Nikita Khandelwal[#], Alex Meholic[#], Sahil Laheri[#], Akshay Sharma & **Blake N. Johnson***, Low-cost Sensor-integrated 3D Printed Personalized Prosthetic Hands for Children with Amniotic Band Syndrome: A Case Study in Sensing Pressure Distribution on an Anatomical Human-Machine Interface (AHMI) using 3D Printed Conformal Electrode Arrays. *PLoS One* **14** e00214120 (2019).
 - [Highlights: Smithsonian Institute’s National Museum of American History \(ACcelerate Festival 2019, Washington DC\); FOX 5 DC; AAAS EurekaAlert; 3DPrintingIndustry.com \(“Sensing the Perfect Fit of Prosthetics”\); The Engineer; Science Times; and others.](#)
- 20) Alexander P. Haring, Emily Thompson, Sahil Laheri[#], Yuxin Tong, Ellen Cesewski, Harald Sontheimer & **Blake N. Johnson***, Process- and Bio-inspired Hydrogels for 3D Bioprinting of Soft Free-standing Neural and Glial Tissues. *Biofabrication* **11** 025009 (2019).

- 21) Manjot Singh, Alexander P. Haring, Yuxin Tong, Ellen Cesewski, Ross Jasper, Eric Ball, Eric Davis & **Blake N. Johnson**^{*}, 3D Printing of Solvent-cast Polymers. *ACS Applied Materials & Interfaces* **11** 6652-6661 (2019).
- 22) Lei Zhang, Guojing Yang, **Blake N. Johnson**, & Xiaofeng Jia^{*}, Three-dimensional (3D) Printed Tissue Engineered Scaffolds for Critical-sized Bone Defect Repair. *Acta Biomaterialia* **84** 16-33 (2019).
- 23) Jamie Murbach, Seth Currlin, Adrienne Widener, Yuxin Tong, Shrirang Chhatre Vivek Subramanian, David Martin, **Blake N. Johnson**, Kevin Otto^{*}, In Situ Polymerization of Poly(3,4-ethylene dioxythiophene) (PEDOT) for Peripheral Nerve Interfaces. *MRS Communications* **8** 1043-1049 (2018).
- 24) Megha Trivedi, Joann Jee, Suzanila Silva, Carmel Blomgren, Vasco M. Pontinha, Dave L. Dixon, Benjamin Van Tassel, Michael J. Bortner, Christopher Williams, Eric Gilmer, Alexander P. Haring, Justin Halper, **Blake N. Johnson**, Zhenyu Kong, Matthew S. Halquist, Paul F. Rochelau, Timothy Long, Thomas Roper & Dayanjan S. Wijesinghe^{*}, Additive Manufacturing of Pharmaceuticals for Precision Medicine Applications: A Review of the Promises and Perils in Implementation. *Additive Manufacturing* **23** 319-328 (2018).
- 25) Ellen Cesewski[†], Alexander P. Haring[†], Yuxin Tong, Michael D. Powell, Kaitlin Read, Manjot Singh, Rajan Thunkur, Sahil Laheri[#], Michael D. Powell, Kaitlin Read, Kenneth J. Oestreich & **Blake N. Johnson**^{*}, Additive Manufacturing of Three Dimensional (3D) Microelectromechanical Systems for Acoustofluidic Application. *Lab on a Chip* **18** 2087-2098 (2018).
- 26) Alexander P. Haring, Yuxin Tong, Justin Halper & **Blake N. Johnson**^{*}, 3D Printed Polypills with Programmable Multi-component Temporal Release Profiles via Core-Shell, Multilayer, and Gradient Distributions. *Advanced Healthcare Materials* **7** 1800213 (2018).
- [Back Cover](#)
- 27) Yuxin Tong, Jamie M. Murbach, Vivek Subramanian, Shrirang Chhatre, Francisco Delgado, David C. Martin, Kevin J. Otto, Mario Romero-Ortega, & **Blake N. Johnson**^{*}, A Hybrid 3D Printing and Robotic-assisted Embedding Approach for Design and Fabrication of Nerve Cuffs with Integrated Locking Mechanisms. *MRS Advances* **3** 2365-2372 (2018).
- 28) Manjot Singh[†], Yuxin Tong[†], Kelly Webster, Ellen Cesewski, Alexander P. Haring, Sahil Laheri[#], Timothy J. O'Brien, Charles H. Aardema, Bill Carswell, Ryan Senger, John L. Robertson, & **Blake N. Johnson**^{*}, 3D Printed Conformal Microfluidics for Isolation and Profiling of Biomarkers from Whole Organs. *Lab on a Chip* **17** 2561-2571 (2017).
- [Back Cover](#)
 - [Top 10% article in Lab on Chip.](#)
 - [Highlights: Nature Reviews Materials \(2020\) doi.org/10.1038/s41578-020-00235-2; 3Dprint.com](#)
- 29) Alexander P. Haring[†], Assad Khan[†], Guoliang Liu^{*}, & **Blake N. Johnson**^{*}, 3D Printed Functionally Graded Plasmonic Constructs. *Advanced Optical Materials* **5** 1-9 (2017).
- [Front Cover](#)

- 30) Alexander P. Haring, Harald Sontheimer & **Blake N. Johnson***, Microphysiological Human Brain and Neural Systems on a Chip: Potential Alternatives to Small Animal Models and Emerging Platforms for Drug Discovery and Personalized Medicine. *Stem Cell Reviews and Reports* **13** 381-406 (2017).
- 31) **Blake N. Johnson*** & Raj Mutharasan, Acoustofluidic Particle Trapping, Manipulation, and Release using Dynamic-mode Cantilever Sensors. *Analyst* **142** 123-131 (2016).
- 32) **Blake N. Johnson***, Advanced Material Dispensing Technology: A Driving Force for 3D Printing Innovations. *IIE Magazine* **48** 54-55 (2016).
- 33) Yong Lin Kong*, Maneesh K. Gupta, **Blake N. Johnson**, & Michael C. McAlpine*, 3D Bionic Nanodevices. *Nano Today* **11** 330-350, (2016).
- 34) **Blake N. Johnson*** & Xiaofeng Jia*, 3D Printed Nerve Guidance Channels: Computer-aided Control of Geometry, Physical Cues, Biological Supplements and Gradients. *Neural Regeneration Research* **11** 1-2 (2016).
- 35) **Blake N. Johnson*** & Michael C. McAlpine*, From Print to Patient: 3D Printing Personalized Nerve Regeneration. *The Biochemist* **38** 28-31(2016).
- 36) **Blake N. Johnson†**, Karen Z. Lancaster†, Fanben Meng, Esteban A. Engel, Yong Lin Kong, Ian B. Hogue, Lynn W. Enquist & Michael C. McAlpine*, 3D printed nervous system-on-a-chip. *Lab on a Chip* **16** 1393-1400, (2016).
- 37) **Blake N. Johnson**, Karen Z. Lancaster, Esteban A. Engel, Yong Lin Kong, Maneesh K. Gupta, Kellin Krick, Fanben Meng, Lynn W. Enquist, Xiaofeng Jia* & Michael C. McAlpine*, 3D printed anatomical nerve regeneration pathways. *Advanced Functional Materials* **25** 6205-6217 (2015).
- [Highlights: NPR \(Roanoke\); MIT Technology Review; NIH News and Events - Research Matters; IIE Magazine, the Virginia Tech News; and others.](#)
- 38) Maneesh K. Gupta, Fanben Meng, Yong Lin Kong, **Blake N. Johnson**, Nina Masters#, Srikanth Singamaneni, & Michael C. McAlpine*, 3D printed programmable release capsules. *Nano Letters* **15** 5321-5329 (2015).
- [Highlights: NIH National Institute of Biomedical Imaging and Bioengineering.](#)
- 39) Yong Lin Kong, Ian Tamargo#, H. Kim, **Blake N. Johnson**, Maneesh K. Gupta, T.-W. Koh, Huai-An Chin, Barry P. Rand, Daniel A. Steingart, & Michael C. McAlpine*, 3D printed quantum dot light-emitting diodes. *Nano Letters* **14** 7017-7023 (2014).
- [Highlights: Nature \(2014\) 515, 468; Nature \(2015\) 518, 42-43; and MIT Technology Review.](#)
- 40) **Blake N. Johnson** & Raj Mutharasan*, Biosensor-based microRNA detection: techniques, design, performance, and challenges. *Analyst* **139** 1576-1588, (2014).
- 41) **Blake N. Johnson** & Raj Mutharasan*, Reduction of nonspecific protein adsorption on cantilever biosensors caused by transverse resonant mode vibration. *Analyst* **139** 12333-12341, (2014).
- 42) **Blake N. Johnson** & Raj Mutharasan*, A cantilever biosensor-based assay for toxin-producing cyanobacteria *Microcystis aeruginosa* using 16S rRNA. *Environmental Science & Technology* **42** 12333-12341, (2013).

- 43) **Blake N. Johnson** & Raj Mutharasan*, Electrochemical piezoelectric-excited millimeter-sized cantilevers (ePEMCs) for simultaneous dual transduction biosensing. *Analyst* **138** 6365-6371, (2013).
- 44) **Blake N. Johnson**, Harsh Sharma, & Raj Mutharasan*, Torsional and lateral anchor cantilever sensors. *Analytical Chemistry* **85** 1760-1766, (2013).
- Highlights: SeparationsNOW.com.
- 45) **Blake N. Johnson** & Raj Mutharasan*, Regeneration of gold surfaces covered by adsorbed thiols and proteins using liquid-phase hydrogen peroxide-mediated UV-Photooxidation. *Journal of Physical Chemistry C* **117** 1335-1341, (2013).
- 46) **Blake N. Johnson** & Raj Mutharasan*, Sample preparation-free real-time detection of microRNA in human serum using piezoelectric biosensors at attomole level. *Analytical Chemistry* **84** 10426-10436 (2012).
- Highlights: Drexel Engineering News.
- 47) **Blake N. Johnson** & Raj Mutharasan*, pH Effect on protein G orientation on gold surfaces and characterization of adsorption thermodynamics. *Langmuir* **28** 6928-6934 (2012).
- 48) **Blake N. Johnson** & Raj Mutharasan*, Biosensing using dynamic-mode cantilever sensors: A review. *Biosensors and Bioelectronics* **32** 1-18 (2012).
- 49) **Blake N. Johnson** & Raj Mutharasan*, A novel experimental technique for determining node location in resonant mode sensors. *Journal of Micromechanics and Microengineering* **21** 065027 (2011).
- 50) **Blake N. Johnson** & Raj Mutharasan*, The origin of low-order and high-order impedance-coupled resonant modes in piezoelectric-excited millimeter-sized cantilever (PEMC) sensors: Experiments and finite element models. *Sensors and Actuators B: Chemical* **155** 868-877, (2011).
- 51) **Blake N. Johnson** & Raj Mutharasan*, Persistence of bending and torsional modes in piezoelectric-excited millimeter-sized cantilever (PEMC) sensors in viscous liquids – 1 to 1,000 cP. *Journal of Applied Physics* **109** 066105 (2011).
- 52) Harsh Sharma, Ramji S. Lakshmanan, **Blake N. Johnson**, & Raj Mutharasan*, Piezoelectric cantilever sensors with asymmetric anchor exhibit picogram sensitivity in liquid. *Sensors and Actuators B: Chemical* **153** 64-70 (2011).
- 53) **Blake N. Johnson** & Raj Mutharasan*, Expression of picogram sensitive bending modes in piezoelectric cantilever sensors with non-uniform electric fields generated by asymmetric electrodes. *Review of Scientific Instruments* **81** 125108 (2010).

Book Chapters

- 1) Yang Liu & **Blake N. Johnson***, Chapter 10: Electrochemical Biosensors for Detection of SARS-CoV-2 In: *Sensing Tools and Techniques for COVID-19: Developments and Challenges in Analysis and Detection of Coronavirus*. Editors: Sudheesh Shulka & Chaudhery Hussain, Elsevier (2022). ISBN: 9780323902809

- 2) Alexander Haring & **Blake N. Johnson**^{*}, Chapter 6: Brain(s)-on-a-chip systems for modeling disease pathogenesis. In: *Organs-on-a-chip: Engineered Microenvironments for Safety and Efficacy Testing*. Editors: David Bovard, Julia Hoeng, & Manuel C. Peitsch, [Elsevier](#) (2019). ISBN: 978-0-12-817202-5
- 3) Alexander P. Haring, Ellen Cesewski & **Blake N. Johnson**^{*}, Chapter 17: Piezoelectric cantilever biosensors for label-free, real-time detection of DNA and RNA. In: *Biosensors and Biodetection: Methods and Protocols, Volume 2: Electrochemical, Bioelectronic, Piezoelectric, Cellular and Molecular Biosensors*. Editors: Avraham Rasooly & Ben Prickril, [Springer](#) (2017).
- 4) **Blake N. Johnson** & Raj Mutharasan^{*}, Chapter 16: Biosensors. In: *Resonant MEMS: Principles, Modeling, Implementation and Applications*. Editors: Oliver Brand, Isabelle Dufour, Stephen Heinrich, Fabien Josse, Jan G. Korvink, & Osamu Tabata, Advanced Micro & Nanosystems Series, [Wiley-VHC Verlag](#) (2013).

Books

Under Preparation

- 1) **Blake N. Johnson**^{*}, Machine Learning for Chemical, Bio-, and Compositional Analysis. [Elsevier](#), Proposal Under Review (2022).

Conference Papers

- 1) Srikanthan Ramesh^{*}, Sam Gerdes, Sharon Lau, Azadeh Mostafavi, Zhenyu Kong, **Blake Johnson**, Ali Tamayol, Prahalada Rao, Iris Rivero, Rheological, In Situ Printability and Cell Viability Analysis of Hydrogels for Muscle Tissue Engineering, 2018 Annual International Solid Freeform Fabrication (2018).
- 2) **Blake N. Johnson** & Raj Mutharasan^{*}, The Origin of Mass-change Sensitivity within Piezoelectrically-actuated Millimeter-sized Cantilever (PEMC) sensors: Vibrational Analysis through Experiment and Finite Element Modeling, Proceedings of the COMSOL Conference, 1-5 (2009).

Patents

- 1) Michael C. McAlpine & **Blake N. Johnson**, Method of producing a 3D subject specific biomimetic nerve conduit, [US Patent 10,405,963 B2](#) (2019).
- 2) Raj Mutharasan, **Blake N. Johnson**, Ramji S. Lakshamanan, & Harsh Sharma, Asymmetric sensor. [US Patent 10,139,270 B2](#) (2018).
- 3) Michael C. McAlpine, Manu Mannoor, Yong Lin Kong, & **Blake N. Johnson**, Multi-functional hybrid devices/structures using 3D printing, [US Patent 9,517,128](#) (2016).

- 4) Raj Mutharasan, Sen Xu, **Blake N. Johnson**, Harsh Sharma, & Ramji S. Lakshmaman, Detection and measurement of mass change using an electromechanical resonator. *US Patent 8,809,065* (2014).

Non-Provisional Patent Applications

- 1) Raj Mutharasan & **Blake N. Johnson**, Dual-mode sensor. *US App. # 14/467,493* (2013).

Provisional Patent Applications and Intellectual Property Disclosures

- 1) **Blake N. Johnson** & Manjot Singh, Three-dimensional (3D)-Printed Well Plate-integrated Piezoelectric Cantilever Sensors for Cell Culture Monitoring. VTIP 21-032 (2022). *US Provisional App. 63/327,089* (2022).
- 2) **Blake N. Johnson**, Yuxin Tong, John Robertson, Zhang Feng, and Xiaoting Jia, Three-dimensional (3D)-Printable Stretchable Triboelectric Nanogenerator Fibers, Devices Made Therewith, and a Method of 3D Printing the Fibers. VTIP 20-053 *US Provisional App. 63/016,628* (2020).
- 3) **Blake N. Johnson**, Alexander Haring, Manjot Singh, Junru Zheng, Sensor-based High Throughput Rheological Characterization. VTIP 20-049. *US Provisional App. 63/010,621/918,657* (2022).
- 4) **Blake N. Johnson**, Alexander Haring, Manjot Singh, Junru Zheng, Sensor-based High Throughput Material Characterization Platform and Methods of Uses Thereof. *International Patent Application PTC/US21/27521* (2021).

Sponsored Research

Table 2 – Summary of Sponsored Research and Grants Awarded

Funding Category	Total	Personal Share
External	\$27,938,867	\$2,602,036
Internal/External	\$80,000	\$72,500
Internal	\$110,000	\$70,000
Total Funded Research	\$28,128,867	\$2,744,536

1. **Blake N. Johnson** & Shayn Peirce-Cottler, **National Science Foundation**, Collaborative Research: ISS: Real-time Sensing of Extracellular Matrix Remodeling during Fibroblast Phenotype Switching and Vascular Network Formation in Wound Healing. 3 years, \$399,791, Virginia Tech, (2022). *Personal Share 56% = \$224,791*

University Collaborator: University of Virginia; *Industry Collaborator:* Space Tango, Inc.

2. **Blake N. Johnson, National Science Foundation**, CAREER: Transforming Biosensor Reliability using Sensor Time-series Data and Physics-based Machine Learning. 5 years, \$542,197, Virginia Tech, (2022). **Personal Share 100% = \$542,197**
3. John Robertson, **Blake N. Johnson**, Xiaoting Jia, Elham Morshedzadeh, **Virginia Tech ICTAS EFO Opportunity Seed Investment Grant**, Multi-sensor array/system (MSAS) for real-time monitoring of patients during hemodialysis (HD) treatment. 1 year, \$10,000, Virginia Tech, (2021). **Personal Share 10% = \$1,000**
4. **Blake N. Johnson & Shayn Peirce-Cottler, National Science Foundation**, EAGER: Collaborative Research: High-throughput Real-time Monitoring of Tissue Mechanical Property Change via Impedimetric Sensor Arrays. 3 years, \$300,000, Virginia Tech, (2021). **Personal Share 58% = \$174,817**

University Collaborator: University of Virginia; *Industry Collaborator:* Space Tango, Inc.

5. Maren Roman, Alan Esker, Robert Moore, Sanket Deshmukh, Valerie Welborn, Kevin Edgar, & **Blake N. Johnson, National Science Foundation**, Partnership for Research and Education in Materials to Fuel Opportunities for Successful and Transformative Retention of Chemistry Majors (PREM to FOSTER-Chem) in Graduate Programs. 3 years, \$839,980, Virginia Tech, (2021). **Personal Share 13% = \$109,197**

University Collaborator: Florida A&M University

6. **Blake N. Johnson, Advanced Regenerative Medicine Institute**, Sensitive and Selective Continuous Monitoring of Secreted Genes in Tissue Cultures using Label-free Cantilever Biosensors. 1.5 years, \$489,322, Virginia Tech, (2020). **Personal Share 100% = \$489,322**

Industry Collaborators: Rockwell Automation & Scientific Bioprocessing, Inc.

7. Maren Roman, Alan Esker, **Blake N. Johnson**, Narasimhamurthy Shanaiah , Rich Helm, Sanket Deshmukh, Zhenyu Kong, John Matson & Robert Moore, **National Science Foundation**, Glycomaterials Materials Innovation Platform (GlycoMIP). 5 years, \$22,900,000, Virginia Tech, (2020). **Personal Share ~ 2% = \$403,252**

<https://glycomip.org/>

8. **Blake N. Johnson & Alejandro Salado, Northrop Grumman Corporation**, 3D-Printing of Electronics on Thermal Blankets to Enable Fast Manufacturing and Integration of Satellites, 1 year, \$20,000, Virginia Tech, (2019). **Personal Share = 100% = \$12,500**
9. **Blake N. Johnson, Northrop Grumman Corporation**, Sensor-Process Integration for Closed-loop Controlled Conformal Additive Manufacturing on Complex Flight-Certified/Airworthy Parts in the Presence of Mechanical Disturbances, 1 year, \$20,000, Virginia Tech, (2019). **Personal Share = 100% = \$20,000**

10. **Blake N. Johnson, Northrop Grumman Corporation**, Closed-loop Controlled Tool Path Programming Algorithms for Inspection, Repair, and Post-processing Modification of Geometrically Complex Flight Certified/Airworthy Parts via Conformal Additive Manufacturing (AM), 1 year, \$20,000, Virginia Tech, (2019). **Personal Share = 100% = \$20,000**
11. **Blake N. Johnson**, Walter Lee, Bevelee Watford, David Knight, **National Science Foundation**; DUE-1644138; Supplement: The Virginia Tech Network for Engineering Transfer Students (VT-NETS), 4 years, \$400,612, Virginia Tech, (2018). **Personal Share = 40% = \$184,245.**
12. **Blake N. Johnson**, Akshay Sharma, David Dillard, **Virginia Tech Institute for Creativity Arts & Technology**, Scanning-driven Design, Additive Manufacturing, and Assessment of Patient-Specific Biomedical Devices: From Personalized Prosthetics for Children with Amniotic Band Syndrome to Bio-inspired Prosthetics for Organ Transplantation, 1 year, \$20,000, Virginia Tech, (2018). **Personal Share = 100% = \$20,000.**
13. **Blake N. Johnson, Air Force Research Laboratory via UES, Inc.**, High Throughput Physical Property Extraction from Bio-engineered Protein Hydrogels via Dynamic Acoustic Analysis, 1 year, \$67,731, Virginia Tech, (2018). **Personal Share = 100% = \$67,731**
14. **Blake N. Johnson, Virginia Tech Student Engineering Council**, Design and Fabrication of Personalized and Bio-inspired Prosthetic Devices for Children with Amniotic Band Syndrome and Smart Perfusion of Whole Organs via an Integrated Structured Light Scanning and Additive Manufacturing Process, 1 year, \$10,000, Virginia Tech, (2018). **Personal Share = 100% = \$10,000**
15. **Blake N. Johnson, Northrop Grumman Corporation**, Tool Path Programming for Inspection, Repair, and Post-processing Modification of Geometrically Complex Flight Certified/Airworthy Parts via Conformal Additive Manufacturing (AM), 1 year, \$20,000, Virginia Tech, (2018). **Personal Share = 100% = \$20,000**
16. Zhenyu Kong, **Blake Johnson**, and Haibo Zeng, **National Science Foundation**; CMMI-1739318; CPS: Medium: Collaborative Research: Cyber-Enabled Online Quality Assurance for Scalable Additive Bio-Manufacturing, 3 years, \$800,000, Virginia Tech, (2017). **Personal Share = 35% = \$280,000**

University Collaborator: University of Nebraska-Lincoln; Industry Collaborator: CellInk

17. Kenneth Oestreich and **Blake N. Johnson, Virginia Tech Institute for Critical Technology and Applied Science**, Junior Faculty Award, A Novel Bioengineering Approach to Manufacture CAR T Cells for Immunotherapy, 2 years, \$80,000, Virginia Tech, (2017). **Personal Share = 50% = \$40,000**

18. Carolina Tallon, Celine Hin, Michael Bortner, Christopher Williams, Srinath Ekkad, Alan Druschitz, Earl Foster, Alexander Aning, **Blake N. Johnson**, Guo Quan Lu, Peizhen Lu, Shashank Priya, David Clark, & Hang Yu, **Office of Naval Research**, Defense University Research Instrumentation Program; Hot Isostatic Press for Advanced Manufacturing and Materials Development, \$895,000, Virginia Tech, (2016). **Personal Share = 2% = \$17,900**
19. **Blake N. Johnson**, **National Science Foundation**; CBET-1650601; EAGER: Non-invasive Sensing of Superficial Organ Tissue via Conforming Multi-parametric Microfluidic Organ Biosensors (MMOBs): Shifting the Paradigm for Organ Assessment, 3 years, \$164,000, Virginia Tech, (2016). **Personal Share = 100% = \$164,000**
20. Timothy Long, Susan Duncan, Christopher Williams, Robert Moore, Amanda Morris, **Blake N. Johnson**, John Matson, Louis Madsen, Bradford Mills, Shengfeng Cheng, Madeline Schreiber, & Judy Riffle, **National Science Foundation**; CHE-1560204; REU Site:INFEWS/N/P/H2O: Materials Innovation at the intersection of Food-Energy-Water Systems (MII-FEWS), 3 years, \$350,000, Virginia Tech, (2015). **Personal Share = 8% = \$29,167**

Research Experience

- Virginia Tech *2015 – present*
Assistant Professor
 Department of Industrial and Systems Engineering
 Research: Advanced biomanufacturing, biofabrication, and biosensing
- Princeton University *2013 – 2014*
Postdoctoral Associate
 Department of Mechanical and Aerospace Engineering
 Research: 3D bioprinting and multi-material 3D printing of functional materials and devices
 Sponsor: Professor Michael C. McAlpine
- Drexel University *2008 – 2013*
Graduate Research Assistant
 Department of Chemical and Biological Engineering
 Research: Detection of cells and biomacromolecules in complex matrices using label-free hybrid biosensors
 Graduate Advisor: Professor Raj Mutharasan
- Academy of Natural Sciences of Philadelphia *2012 – 2013*
Research Assistant
 Department of Microbiology
 Research: Separation and phylogenetic characterization of algae
 Sponsor: Dr. Marina Potapova

- University of Wisconsin - Madison 2007 – 2008
Research Assistant
 Department of Chemical and Biological Engineering
 Research: Water-free biodiesel synthesis via anion-exchange resins
 Undergraduate Advisor: Professor Thatcher W. Root

Industry Experience

- Precision Sensing and Analytics, LLC (Blacksburg, VA USA) 2022 - Present
Founder and Chief Executive Officer
- ProgrAM3D, LLC (Pembroke, VA USA) 2016 – 2021
Founder and Chief Executive Officer
- 3DNeuroTec, LLC (Planisboro, NJ USA) 2015 – 2016
Founder and Chief Executive Officer
- Leversense, LLC (Philadelphia, PA USA) 2010 – 2012
 - *Research Scientist*
 - Role: Development of multiplexed biosensor arrays
 - Advisors: Dr. Paul Horan; Pete Nagy, M.B.A.
- Eastwood Nursing Center (Negaunee, MI USA) 2013 - Present
 - *Junior Board Member*
- Norlite Nursing Center (Marquette, MI USA) 2013 - Present
 - *Junior Board Member*

Teaching and Pedagogical Interests

- Subject Areas
 - Manufacturing and Biomanufacturing Processes, Biosensing and Biosensors, Bioprocess Engineering, Chemical Engineering, Process Modeling and Engineering Mathematics
- Pedagogy
 - Active Learning Environments for Manufacturing Education
 - Experiential Learning for Computer-aided Manufacturing and Bio-inspired Design Education

Workshops

- 1) Workshop on Measurement Needs for Biofabrication of Tissue Engineered Medical Products, National Institutes for Standards and Technology (NIST), 2022.
- 2) NSF SBIR/STTR Proposal Prep Workshop, Virginia Innovation Partnership Corporation (VIPIC), U.S. Small Business Administration, Virtual, 2022.
- 3) AI-Guided Materials Workshop. Virginia Tech, Blacksburg, VA 2022.
- 4) Learning about Machine Learning Workshop for Materials Research. Macromolecules Innovation Institute, Virginia Tech, Blacksburg, VA 2019.
- 5) 4th Annual Advanced Biomanufacturing Symposium, University of Virginia, Charlottesville, VA 2019.
- 6) ICORP Short Course: *Invitation-only* NSF-sponsored Workshop to Fund Entrepreneurial Technologists to Pursue Commercialization. Virginia Tech, Blacksburg, VA 2018.
- 7) Persh 2017: *Invitation-only* DOD-sponsored Workshop on the Interface Between Biological and Man-Made Materials. Institute for Defense Analysis, Alexandria, VA 2017.
- 8) NSF Proposal Writing Workshop, NAMRC-MSEC Conference, Blacksburg, VA 2016.
- 9) Proposal Development Institute, Virginia Tech, 2016.
- 10) Faculty Mentoring Program, Virginia Tech, 2016.
- 11) CIDER Course Development Program, Virginia Tech, 2015.
- 12) Workshop on Microalgal Culturing. UTEX Culture Collection, University of Texas. Austin, TX 2011.
- 13) COMSOL Multiphysics Finite Element Modeling Workshop, Boston, MA, 2009.

Seminars, Colloquia and Conference Proceedings (as Invited Speaker)

- 1) Physics-guided Smart Sensing of Composition and Properties: Applications in Materials and Biomanufacturing 4.0, Department of Electrical and Computer Engineering, North Carolina State University, Raleigh, NC November 2022.
- 2) High-Throughput Formulation and Characterization of Engineered Hydrogels, *AI-guided Materials Workshop*, Virginia Tech, April 2022.
- 3) Continuous Monitoring and High-Throughput Characterization of Engineered 3D Cell Culture Models, *Computational Tissue Engineering IGEP*, Virginia Tech, November 2021.
- 4) Fundamentals of Rheology, National Science Foundation MIP Seminar (GlycoMIP), Online Conference, June 2021.
- 5) Real-time Sensor-based Monitoring of 3D Bioprinting Processes, Department of Mechanical Engineering, University of Minnesota, Minneapolis, MN October 2020.
- 6) Bio-inspired Design and Additive Manufacturing using Point Cloud Data: from Anatomical Implantable Scaffolds, Personalized Wearables, to Organ-conforming Devices, Department of Industrial Design, Virginia Tech, October 2019.

- 7) Low-cost 3D Printed Personalized Bionic Prosthetic Hands for Children with Birth Defects, ACCelerate Creativity and Innovation Festival, Smithsonian's National Museum of American History, Washington DC, April 2019.
- 8) 3D Printed Anatomical Nerve Regeneration Pathways, *Regenerative Medicine Interdisciplinary Graduate Research Program*, Virginia Tech, Blacksburg, VA April 2018 (Oral Presentation).
- 9) Fiber Type Targeted In Situ Polymerized Electrodes for Peripheral Nerve Interface, *Materials Research Society (MRS) Conference*, Phoenix, AZ April 2018 (Paper & Oral Presentation).
- 10) 3D Printed Anatomical Nerve Regeneration Pathways, *3rd International Interdisciplinary 3D Conference*, University of Pécs, Pécs, Hungary, October 2017 (Oral Presentation).
Keynote
- 11) Hybrid Cantilever Biosensors for Sample Preparation-free Detection of miRNA in Human Serum, *Invitation-only Symposium on Label-free Assay of Oncogenic/Tumor Suppressor Biomolecules, American Chemical Society National Meeting*, Washington, DC August 2017 (Abstract & Oral Presentation).
- 12) 3D Printed Anatomical Nerve Regeneration Pathways, *2nd International Conference on 3D Printing in Medicine*, Mainz, Germany, May 2017 (Oral Presentation). **Keynote**
- 13) Emergence of 3D Printed Materials for 3D Cell Culture, Medical Implants and Imaging: Persh 2017: *Invitation-only DOD-sponsored Workshop on the Interface between Biological and Man-Made Materials*. Institute for Defense Analysis, Alexandria, VA February 2017 (Oral Presentation).
- 14) 3D Printed Neural Systems on a Chip, *5th International Conference on Glial Biology in Medicine*, Roanoke, VA October 2016 (Oral Presentation).
- 15) 3D Printed Nerve Regeneration Scaffolds and Nervous Systems on a Chip, *Virginia-Nordic Precision Neuroscience Conference*, Virginia Tech Carillion Research Institute, Roanoke, VA October 2016 (Poster Presentation).
- 16) 3D Printed Neural Interfaces, *Macromolecules Innovation Institute Annual Meeting*, Virginia Tech, Blacksburg, VA October 2016 (Oral Presentation).
- 17) Additive Biomanufacturing (BioAM) Tutorial, *NAMRC-MSEC Conference*, Blacksburg, VA June 2016 (Oral Presentation).
- 18) Macromolecules and Interfaces Institute (MII) Seminar, *Virginia Bioinformatics Institute*, Virginia Tech, Blacksburg, VA December 2015 (Oral Presentation).
- 19) Virginia Tech Carillion Research Institute (VTCRI), Sonthimer Lab, Virginia Tech, Roanoke, VA November 2015 (Oral Presentation).
- 20) Workshop on 3D Bioprinting in Tissue Engineering, Regenerative Medicine and Life Science: Theory and Applications, Host: Paul Gatenholm, Stanford University, CA October 2015 (Oral Presentation).
- 21) Department of Materials Science and Engineering, Virginia Tech, Blacksburg, VA October 2015 (Oral Presentation).
- 22) Workshop on New Developments in Laboratory Technology, Virginia Tech, Blacksburg, VA October, 2015 (Oral Presentation). **Keynote**

- 23) Institute for Operations Research and Management Sciences (INFORMS), Virginia Tech Chapter, Virginia Tech, Blacksburg, VA September 2015 (Oral Presentation).
- 24) Department of Chemical Engineering, Virginia Tech, Blacksburg, VA September 2015 (Oral Presentation).
- 25) Department of Molecular Biology, Enquist Lab, Princeton University, Princeton, NJ May 2015 (Oral Presentation).
- 26) Personalized Nerve Regeneration Pathways, *10th Annual Innovation Forum – Princeton University*, Princeton, NJ 2015 (Oral Presentation).
- 27) 3D printed nerve conduits for complex nerve regeneration, *American Institute of Chemical Engineers Conference*, Atlanta, GA 2014 (Abstract & Oral Presentation).
- 28) Three-Dimensional (3D) Biofabrication Approaches for Creation of Multi-Functional Nerve Guidance Channels and Organ-on-Chip Platforms for Peripheral Nerve Regeneration, *American Institute of Chemical Engineers Conference*, Atlanta, GA 2014 (Poster Presentation).
- 29) 3D printed nerve conduits for complex nerve regeneration, *DuPont Experimental Station*, Wilmington, DE 2014 (Oral Presentation).
- 30) Three-Dimensional Neural Engineering Approaches, *Bioengineering Colloquium – Princeton University*, Princeton, NJ 2014 (Oral Presentation).
- 31) Detection of microRNA with piezoelectric cantilever sensors, *American Institute of Chemical Engineers Conference*, Pittsburg, PA 2012 (Abstract & Oral Presentation).
- 32) Effect of pH on protein G orientation on gold surfaces and characterization of adsorption thermodynamics, *244th American Chemical Society Conference*, Philadelphia, PA 2012 (Abstract & Oral Presentation).
- 33) Role of asymmetry in piezoelectric actuators, *American Institute of Chemical Engineers Conference*, Pittsburg, PA 2012 (Abstract & Oral Presentation).
- 34) High-order modes in piezoelectric cantilever sensors. *8th International Nanomechanical Sensing Conference*, Trinity College, Dublin, Ireland 2011 (Abstract & Poster Presentation).
- 35) The origin of mass-change sensitivity in piezoelectric-excited millimeter-sized cantilever (PEMC) sensors. *COMSOL Multiphysics Conference*, Boston, MA 2009 (Paper & Oral Presentation).

Conference Proceedings (as *Non-presenting Author*)

- 1) Junru Zhang, Purna Srivatsa, and **Blake N. Johnson**, Sensitive and Selective Detection of MicroRNA in Human Serum using Supervised Machine Learning, 7th World Congress of Digital Olfaction Society, Tokyo, Japan 2022.
- 2) David Csordas, Junru Zhang, Julie Leonard-Duke, Paul DeCostanza, **Blake N. Johnson** and Shayn Peirce-Cottler, Mechanical and Biological Monitoring of Tissue Stiffness in Three-Dimensional Fibroblast Culture, ASMB 2022 Workshop: The Many Faces of Fibroblasts, Charlottesville, VA 2022.

- 3) Junru Zhang and **Blake N. Johnson**, High-throughput Characterization Via Automated Sensing and Machine Learning, INFORMS Annual Meeting, Indianapolis, IN 2022.
- 4) David Csordas, Junru Zhang, Julie Leonard-Duke, Paul DeCostanza, **Blake N. Johnson** and Shayn Peirce-Cottler, Mechanical and Biological Monitoring of Tissue Stiffness in Three-Dimensional Fibroblast Culture, SB³C2022 Summer Biomechanics, Bioengineering, and Biotransport Conference, Eastern Shore, MD 2022.
- 5) Julie Leonard-Duke, Junru Zhang, David Csordas, Paul DeCostanza, Shayn Peirce-Cottler, **Blake N. Johnson**, Real-time Monitoring of Tissue Stiffness Changes using Piezoelectric Cantilever Sensor Arrays, 9th World Congress of Biomechanics, Taipei 2022.
- 6) Yuxin Tong, Ziang Feng, Xiaoting Jia, and **Blake N. Johnson** 3D Printed Flexible Triboelectric Nanogenerators: Functional Fibers and Stretchable Mechanosensors, MRS Conference, Boston, MA 2020.
- 7) Srikanthan Ramesh, Sam Gerdes, Sharon Lau, Azadeh Mostafavi, Zhenyu James Kong, **Blake N. Johnson**, Ali Tamayol, Prahalada Rao, Iris V Rivero Rheological, In Situ Printability and Cell Viability Analysis of Hydrogels for Muscle Tissue Regeneration, IISE Conference, 2018.

Teaching Experience

Pedagogical Interests: Physical and Virtual Active Learning

At Virginia Tech:

Table 3 – Summary of Teaching and Effectiveness

Semester	Course Name	Course No.	Credit Hrs.	No. of Lab or Recitation Sections	Course Enrollment	Overall Effectiveness (Reply Rate)
Fall 2022	Manufacturing Processes	ISE 2204	3	0	~50	N/A
Spring 2022	Manufacturing Processes Lab	ISE 2214	1	11	290	5.7/6 (42%)
Spring 2022	Biomanufacturing Processes	ISE 4984/5984	3	0	7	5.8/6 (86%)
Fall 2021	Manufacturing Processes	ISE 2204	3	0	88	5.5/6 (78%)
Spring 2021	Manufacturing Processes Lab	ISE 2214	1	11	265	5.4/6 (44%)
Spring 2020	Additive Biomanufacturing	ISE 4984	3	0	4	5.5/6 (50%)
Fall 2019	Manufacturing Processes Lab	ISE 2214	1	15	350	5.5/6 (44%)

Fall 2019	Manufacturing Processes	ISE 2204	3	0	86	5.62/6 (58%)
Spring 2019	Manufacturing Processes	ISE 2204	3	0	100	5.76/6 (41%)
Spring 2019	Manufacturing Processes Lab	ISE 2214	1	12	285	5.5/6 (25%)
Fall 2018	Additive Biomanufacturing	ISE 6984	3	1	3	6.0/6 (100%)
Spring 2018	Manufacturing Processes Lab	ISE 2214	1	12	277	5.60/6 (90%)
Fall 2017	Interdisciplinary Research in Computational Tissue Engineering	GRAD 5134	3	0	9	5.67/6 (67%)
Fall 2017	Additive Biomanufacturing	ISE 5984	3	0	14	5.77/6 (93%)
Spring 2017	Manufacturing Processes Lab	ISE 2214	1	13	303	5.75/6 (88%)
Fall 2016	Additive Biomanufacturing	ISE 5984	3	0	18	5.89/6 (100%)
Spring 2016	Manufacturing Processes	ISE 2204	3	0	97	5.66/6 (80%)
Fall 2015	Manufacturing Processes	ISE 2204	3	0	66	5.95/6 (33%)

**For comparison, averages for Overall Teaching Effectiveness are $\sim 4.9 \pm 1.3$ for the College of Engineering (VT) and 4.9 ± 1.4 for the Department of Industrial and Systems Engineering (VT).*

- Undergraduate Research – ISE 4994
 - Fall 2017 – 2 students
 - Spring 2017 – 2 students
 - Fall 2016 – 5 students
 - Spring 2016 – 14 students
 - Fall 2015 – 9 students

- Guest Lecturer
 - Process Materials – CHE 4104
 - Fall 2016, 2022 (Instructor: Abby Whittington)

 - Additive Manufacturing – ME 4644/5644
 - Fall 2015 (Instructor: Chris Williams)

 - Introduction to Neuroscience Seminar – NEUR 1004
 - Fall 2015 (Instructor: Harald Sontheimer)

 - Introduction to Industrial and Systems Engineering – ISE 2004
 - Fall 2022 (Instructor: Deborah Dickerson)

 - Introduction to Industrial and Systems Engineering – ISE 5204
 - Fall 2015 - 2022 (Instructors: Don Taylor and Eileen van Aken)

Macromolecular Science and Engineering – MACR 5015
Fall 2015 (Instructor: Tim Long)

Macromolecular Science and Engineering – MACR 5016
Spring 2022 (Instructor: Steven Martin)

At Drexel University:

- Guest Lecturer
Mathematical Methods in Chemical Engineering – CHE 502
Fall 2012 (Instructor: Raj Mutharasan)
- Teaching Assistant
Process Engineering Thermodynamics – CHE 206
Fall 2008

Thermodynamics of Chemical Mixtures – CHE 301
Fall 2008

Process Heat Transfer – CHE 303
Spring 2009

Mathematical Methods in Chemical Engineering – CHE 502
Fall 2009
Fall 2010
Fall 2011
Fall 2012

Advising and Mentoring Experience

Note: Peer-reviewed journal articles have been co-authored with ALL students listed (except those denoted with an asterisks).

Advising Experience

- **Ph.D. Students**

Alexander Haring	Macromolecules	2020
	-Regenerative Medicine IGEP	
Ellen Cesewski	Materials Science and Engineering	2020
Yuxin Tong	Industrial and Systems Engineering	2021
Manjot Singh	Industrial and Systems Engineering	2021
Ezgi Küçükdeğer	Industrial and Systems Engineering	2022
	-Computational Tissue Engineering IGEP	

Yang Liu	Macromolecules -Computational Tissue Engineering IGEP	In Progress
Junru Zhang	Industrial and Systems Engineering	In Progress
Lester Anderson	Macromolecules	In Progress
Xuerui Song	Industrial and Systems Engineering	In Progress
Fazel Haq Ahmadazi	Industrial and Systems Engineering	In Progress

- **M.S. Students**

Non-Thesis

Rajan Thakur	Industrial and Systems Engineering	2017
Purna Srivatsa	Computer Science	2022
Durga ChandraSekhar P.	Computer Science	2022
Asrith Raghavendra	Computer Science	2022
Ritvik Bhardwaj	Industrial and Systems Engineering	2022
Kaveeya Tamizh	Industrial and Systems Engineering	2022
Tanmai Alaham	Industrial and Systems Engineering	2022

M.S. Thesis

Manjot Singh	Industrial and Systems Engineering	2017
Yuxin Tong	Industrial and Systems Engineering	2017
Kelly Webster	Mechanical Engineering Co-advisor: John Robertson	2017

M. Eng.

Justin Halper	Mechanical Engineering	2018
Abhinuv Nitin Pitale	Computer Engineering	2019

- **B.S. Students**

Course Credit for Undergraduate Research

Clememce Hidalgo	Industrial and Systems Engineering	2019
Patrick O'Malley	Industrial and Systems Engineering	2018-2020
Sahil Laheri	Neuroscience	2015-2019
Niki Khandelwal	Industrial and Systems Engineering	2015-2017
Elena Karakozoff	Industrial and Systems Engineering	2015-2018
David McIlvain	Industrial and Systems Engineering	2017-2018
Alex Meholic	Industrial and Systems Engineering	2015-2017
Justin Halper	Industrial and Systems Engineering	2015-2017
Ian Trace	Mechanical Engineering (Princeton)	2013-2014

NSF-funded Research Experience for Undergraduates (NSF-REUs)

- Related to NSF-CHE-1560204

Maria Stang*	Materials Science and Engineering (Ohio State)	2016
Alex Hitomi*	Materials Science and Engineering (UC-Davis)	2017
Miharu Koh	Biochemistry (Allegheny College)	2018

- Related to NSF-CBET-1650601

Justin Halper	Industrial and Systems Engineering	2017
Sahil Laheri	Neuroscience	2017-2018
Daniel Knapp*	Electrical Engineering	2018
Pranay Shaw*	Industrial and Systems Engineering	2018

- Related to NSF-VT-NETS

Ethan Kywe*	General Engineering	2018 - 2019
Mina Shawky*	General Engineering	2018
Nathan Lam	General Engineering	2019
Karen Perez-Serpa	General Engineering	2019
David Rwigema Makuza	General Engineering	2019
Joshua Gardner	General Engineering	2022
Katie Bechtold	General Engineering	2022
Yonatan Duega	General Engineering	2022

- Related to VT-NETS MAOP

Monica Hunter	General Engineering	2022
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- Related to Northrop Grumman

Asa Castleberry	Chemical Engineering	2019 - current
Patrick O'Malley	Industrial and Systems Engineering	2018 – 2020

Thesis Committees and Host for Lab Rotations

- *Ph.D. Committees*

Nidhi Menon*	Translation Biology, Health, and Medicine Advisor: Caroline Jones	2015 - 2020
Garret Burks	Mechanical Engineering Advisor: Alexander Leonessa	2015 – 2019
Camden Chatham*	Mechanical Engineering Advisor: Chris Williams	2016 – 2020
Tim O'Brien	Biomedical Engineering Advisor: John Robertson	2015 – 2020

- | | | |
|--------------|---|-------------|
| Nils Potter* | Biomedical Engineering
Advisor: Mark VanDyke | 2018 – 2019 |
|--------------|---|-------------|
- ***M.S. Thesis and M. Eng. Committees***

Karuniya Mohan*	Industrial and Systems Engineering Advisor: Ran Jin	2015 – 2017
Jin Ran*	Industrial and Systems Engineering Advisor: Ran Jin	2015 – 2018
 - ***Educational Lab Rotations Supported***

Allison Bouslog*	Translational Biology, Medicine and Health	2016
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Internal Service – Departmental and University

- Chair, Student Awards Committee, Department of Industrial and Systems Engineering, 2022-2023.
- Research Mentor and Advisor for Multicultural Academic Opportunities Program (MAOP) Summer Research Program via NSF VT-NETS, Summer, 2022.
- ISE Senior Design Symposium Moderator, April, 2022.
- Reviewer for Outstanding Dissertation Award, Committee Chair: Kevin Edgar, 2022.
- Search Committee for Faculty Position in Advanced Manufacturing, Committee Members: John Shewchuk, Laura Savage, Ran Jin, Zhenyu Kong, Blake Johnson, 2022.
- Undergraduate and Graduate Recruiting Committee, Department of Industrial and Systems Engineering, 2021-2022.
- Building Emergency Coordinator, Virginia Tech Advanced Manufacturing Team (AMT), Research Building 26 (2270 Kraft Dr.), 2021-present.
- Student Awards Committee, Department of Industrial and Systems Engineering, 2020-2021.
- Centennial Recognition and Alumni Committee, Department of Industrial and Systems Engineering, 2020-2021.
- Search Committee for CY Research Professor Position for Virginia Tech-Commonwealth Center for Advanced Manufacturing, Committee Members: Zhenyu Kong, Jaime Camelio, Matt Stremler, Alicia Durham, Blake Johnson, 2019.

- Faculty Mentor, Student Group from School of Art + Design, Project: Design and Workflow Analysis for 3DProsthetic Design Group, VT School of Art and Design, In-collaboration with Akshay Sharma
- Honors & Awards Committee, Department of Industrial and Systems Engineering, 2019-2020.
- Invited Seminar Series Committee, Department of Industrial and Systems Engineering, 2019-2020.
- Lab Tour for Engineering Faculty Organization (EFO) Inspirational Speaker at EFO Fall Meeting, Speaker: Dean Jayathi Murthy (UCLA), September 2019.
- Lab Tour for VT-NETS Program, Center for Enhancing Engineering Diversity, October 2018.
- Strategic Planning Committee, Department of Industrial and Systems Engineering, 2018-2019.
- Search Committee for Faculty Position in Automation and Robotics, Committee Members: Eileen Van Aken, Zhenyu Kong, Jaime Camelio, Alexander Leonessa, Blake Johnson, 2018.
- Faculty-Student Luncheon with Students in Virginia Tech's CEED's STEP Program, Student Host: Bemnet Molla, 2018.
- Search Committee for Technical Staff Hire, Committee Members: Joe Gabbard, Brian Burgess, Randy Waldren, Scott Lancaster, Will Vest, Eileen Van Aken, Blake Johnson, 2018.
- Search Committee for Faculty Position in Industrial Analytics for Cluster Hire in Data Decisions, Committee Members: Eileen Van Aken, Zhenyu Kong, Blake Johnson, 2018.
- Workshop on New Developments in Laboratory Technology, Virginia Tech, Blacksburg, VA October, 2015 (Oral Presentation). Invited Keynote Speaker
- Faculty Advisor for Virginia Tech SME Chapter, 2017 – present.
- Lab Tour for Department of Industrial and Systems Engineering Student Recruiting Weekend March, 2017.
- Guest Lecturer in College of Engineering, College of Sciences, Interdisciplinary Graduate Programs, School of Industrial Design, & School of Neuroscience, 2017 – present.
- COACHE Survey of Faculty Job Satisfaction, March 2017.

- Faculty Panel on Academic Job Application and Interview Process, Virginia Tech Institute for Operations Research and the Management Sciences (INFORMS) Student Chapter, November 2016.
- Expert Interview for Cover Story by Robbie Harris (WVTF-NPR Affiliate), An Evening at Virginia Tech – SECAC, Lynn Hershman Leeson Exhibit, School of Visual Arts, October 2016
- Participating Faculty, Research and Collaboration Presentation, College of Engineering Historically Black Colleges and Universities (HBCU) Summit, October 2016
- Lab Tour for ISE Advisor Board, VA October, 2016.
- NSF Research Experience for Undergraduates, Virginia Tech, 2016 - current.
- Ph.D. Concentration Area Lead, Manufacturing Concentration on Innovative Manufacturing Processes, Department of Industrial and Systems Engineering, October 2016.
- Faculty Contact for Student Society for Hispanic Professional Engineers (SHPE), 2015-2016.
- Chair, Industrial and Systems Engineering Senior Design Symposium April, 2016.
- Center for Enhancement of Engineering Diversity (CEED) Spring Game Recruiting Initiative for Student Engineers (RISE) Event, April 2016.
- Graduate Admissions and Recruiting Committee – Department of Industrial and Systems Engineering, 2015-2018, 2020-2023.
- International Relations Committee – Department of Industrial and Systems Engineering, 2016-2017.

At Princeton University:

- Science in Action Mentor – Princeton University, 2013
Team Targeted Drug Delivery

At Drexel University:

- Faculty Selection Committee Student Representative – Drexel University, 2012
Department of Chemical and Biological Engineering

Invited Reviewer for Research Organizations

- Maryland Industrial Partnerships Program (MIPS), University of Maryland, 2022.
- Deutsche Forschungsgemeinschaft (DFG) (German Research Foundation), 2022
- National Science Foundation, Future Manufacturing Program, 2022.
- European Science Foundation (ESF), ADAGIO (Advanced Manufacturing Research Fellowship Programme in the Basque – New Aquitaine Region), 2022.
- National Science Foundation, Biosensing Program, 2022.
- National Sciences and Engineering Research Council of Canada (NSERC), Materials and Chemical Engineering, 2021.
- Israel Ministry of Science and Technology, *Topic*: Synthetic Biology - Developments and Applications in the Field of Biosensors and Therapy, 2021.
- American Chemical Society (ACS), Petroleum Research Fund (PRF), 2020.
- Austrian Science Fund (FWF), 2020.
- Research Corporation for Advancement of Science (RCSA), COVID-19 Initiative, Novel COVID-19 Detection Strategies, 2020.
- National Science Foundation (NSF), Division of Undergraduate Education, Improving Undergraduate Stem Education: Education and Human Resources (IUSE: EHR), 2020.
- Royal Society of New Zealand Panel, Marsden Fund Council, 2019.
- European Science Foundation (ESF) ERC, Neurological Disorders, Molecular and Cellular Neuroscience, 2019.
- National Institutes of Health, Neurological and Bioengineering Studies Specific Emphasis Panel (SEP), 2018.
- Netherlands Organisation for Scientific Research (NWO), Applied and Engineering Sciences, 2017.
- National Science Foundation (NSF), Chemical, Bioengineering, Environmental, and Transport Systems, Nanobiosensing Program, 2017.

Organizer of Educational and Training Workshops

- Naval Air Systems Command (NAVAIR), Virginia Tech Continuing and Professional Education, Advanced Manufacturing Processes and Technologies Short Course, Additive Biomanufacturing and 3D Structured Light Scanning, ½ Day Training, August, 2016.
- Additive Biomanufacturing (BioAM) Tutorial, *NAMRC-MSEC Conference*, Blacksburg, VA June 2016 (Oral Presentation).
- Workshop on 3D Bioprinting in Tissue Engineering, Regenerative Medicine and Life Science: Theory and Applications, Host: Paul Gatenholm, Stanford University, CA October 2015 (Oral Presentation).

Organizer of Conferences and Conference Symposia

- Co-chair, Session on Dynamic Sensing for Advanced Biomanufacturing Applications, Advanced Biomanufacturing Symposium, University of Virginia, October, 2021 Charlottesville, VA.
- Co-organizer, Symposium on Synthetic Biology and Materials Manufacturing, Materials Research Society, November, 2020, Boston, MA.
- Co-organizer, Poster Session Organizer and Judge, 4th Annual Advanced Biomanufacturing Symposium, University of Virginia, October, 2019 Charlottesville, VA
- Co-organizer, Polymer Additive Manufacturing Session, American Institute of Chemical Engineers Conference, November, 2017, Minneapolis, MN.
- Chair, Electrochemistry Section, Label-Free Assay of Oncogenic/Tumor Suppressor Biomolecules Symposium, American Chemical Society National Meeting, Washington, DC August 2017.
- Conference Co-organizer, North American Manufacturing Research Conference (NAMRC)/Manufacturing Science and Engineering Conference (MSEC) June, 2016 Blacksburg, VA.
- Co-chair, Electrochemical Discharge Machining (EDM) and Electrochemical Machining (ECM) Session, North American Manufacturing Research Conference (NAMRC)/Manufacturing Science and Engineering Conference (MSEC) June, 2016 Blacksburg, VA.
- Tutorial Session on BioAdditive Manufacturing, North American Manufacturing Research Conference (NAMRC)/Manufacturing Science and Engineering Conference (MSEC) June, 2016 Blacksburg, VA.

Additional Service

- NSF INCLUDES National Network, Member, 2022.
- Survey Participant, Study on AI and Potential Societal Impacts, University of Wisconsin-Madison, 2022.

Scholarship

- Editorial Service
Biosensors (IF = 3.2) May 2020 - current
 - Editorial Board Member
 - Guest Editor for Special Issue on 3D-Printed Biosensors
- Invited Reviewer

Journals:

Science
Advanced Materials
Advanced Functional Materials
Biomaterials
ACS Nano
Nano Energy
Advanced Science
Science Advances
Nature Communications
Chemical Engineering Journal
Advanced Healthcare Materials
Material Horizons
Biosensors and Bioelectronics
Journal of Controlled Release
Carbohydrate Polymers
ACS Applied Materials and Interfaces
Biofabrication
Materials and Design
ACS Sensors
Analytical Chemistry
Acta Biomaterialia
Journal of Biomedical Science
Lab on a Chip
Sensors and Actuators B
Molecular Pharmaceutics
Biotechnology and Bioengineering
Biosensors
Neural Regeneration Research

The Analyst
Nanomedicine
Scientific Reports
Sensors and Actuators A
Molecular Chemistry and Physics
Polymers
Polymer
Transactions on Mechatronics
IEEE Sensors Journal
Langmuir
PLOS One
Electroanalysis
Smart Materials and Structures
Biomicrofluidics
MRS Communications
Sensors
Polymer Composites
Journal of Micromechanics and Microengineering
Applied Biochemistry and Biotechnology
Microsystem Technologies
NAMRC-MSEC Conference
-Not a comprehensive list.

Books:

Elsevier
Taylor and Francis

Community Service and Outreach & Leadership

- Low-cost 3D Printed Personalized Prosthetic Hands for Children with Birth Defects, ACCelerate Creativity and Innovation Festival, Smithsonian's National Museum of American History, Washington DC, April 2019.
- 3D Printed Prosthetic Hands for Amniotic Band Syndrome, Undergraduate Research Project (via ISE 4994 and NSF-DUE project), Blacksburg, VA 2016-present. [Highlighted on Fox \(WFXR Roanoke\); CBS \(WBDJ Roanoke\); NBC \(WSLS Roanoke\); Virginia Tech News; and VT Magazine.](#)
- 3D Scanning Tutorial, Blacksburg New School, Blacksburg, VA April, 2016.
- Engineers without Borders - Drexel University Chapter, *Miramar, El Salvador Clean Water Project*, Graduate Student Mentor, 2012.

Consulting Services

- L.E.K. Consulting, Consultee: Vinay Reddy. Topic: Additive Biomanufacturing. June, 2021.
- Prescouter. Topic: Analytical Technology for Biomanufacturing QA/QC. October, 2022.

Professional Memberships

- American Institute of Chemical Engineers (AIChE)
- American Chemical Society (ACS)
- Institute of Industrial and Systems Engineers (IISE)
- Society of Manufacturing Engineers (SME)