

**Bashir Khoda, Ph.D.**  
Associate Professor  
Digital Manufacturing Research Group  
Department of Mechanical Engineering,  
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## 1. Professional Appointments

### **Associate Professor & Smart Manufacturing Coordinator** **2022-Present**

Mechanical Engineering Department, The University of Maine  
Editorial Board Member, Scientific Report (2023)  
Affiliated Faculty, Advanced Structures and Composites Center (ASCC), UMaine  
Affiliated Faculty, Bio-medical Science and Engineering, UMaine  
Affiliated Faculty, Interdisciplinary Material Science and Engineering Program, UMaine

### **Assistant Professor** **2019-2022**

Mechanical Engineering Department, The University of Maine

### **Assistant Professor** **2013-2018**

Industrial & Manufacturing Engineering Department, North Dakota State University  
Affiliate Faculty, Biomedical Engineering Program, NDSU  
Research Faculty, Center for Sustainable Material Science

### **Instructor** **2011- 2013**

University at Buffalo, Industrial and Systems Engineering Department

### **Research and Teaching Assistant** **2007-2012**

University at Buffalo, Industrial and Systems Engineering Department, Buffalo, NY

### **Lecturer** **2004-2007**

Bangladesh University of Engineering & Technology, Industrial and Production Engineering Department  
Dhaka, Bangladesh

### **Engineering Trainee Process Engineer** **2002**

PRAN-RFL Food Industries, Bangladesh

## 2. Academic Qualifications

### **PhD in Industrial and Systems Engineering** **2013**

University at Buffalo, The State University of New York (SUNY), Buffalo, New York, USA

- IIE Doctoral Colloquium (IERC 2011) Nominee, University at Buffalo.
- Future Faculty Workshop, 2011 Nominee, University at Buffalo.
- "Target Your Teaching" 2011 Participant, University at Buffalo.

### **Master of Science (MSc) in Industrial and Production Engineering** **2007**

Bangladesh University of Engineering and Technology (BUET), Dhaka.

### **University Gold Medalist 2007**

### **Bachelor of Science (BSc) in Industrial and Production Engineering** **2004**

Bangladesh University of Engineering and Technology (BUET), Dhaka.

Deans' list award

## 3. Research and Scholarly Contributions

### 3A. Research Focus

Research goal: Unveiling the Principles and Regulations of Engineering for Achieving Smart Manufacturing.

My research is centered around advanced manufacturing science, with a particular emphasis on data-driven design, artificial intelligence-powered material development, the progress of manufacturing processes, and the integration of digitization. In my 'Digital Manufacturing' laboratory, we delve into the design, materials, and their processing behavior across micro, meso, and macro scales. Through the generation, collection, and analysis of both experimental and computational data, we aim to achieve a profound understanding of engineering principles, performance and functionality. The goal is to leverage this knowledge to democratize advanced manufacturing processes and systems, thereby revolutionizing the human-machine synergies in manufacturing engineering.

### 3B1. Successful External Funding

- 1) **NSF-CMMI-MOMS (#2101745):** “Collaborative Proposal: Mechanics of Knots and Tangles of Elastic Rods” Duration: Oct 21-Sep 24; Role: PI; Amount: \$141,905.
- 2) **US-DOT # 693JK31850009CAAP:** “New Bio-Inspired 3D Printing Functionalized Lattice Composites for Actively Preventing and Mitigating Internal Corrosion” Duration: Sep 18-Aug 21; Role: co-PI (50%); Total Amount: \$375,000; PI: Zhibin Lin, (\$127,827 Transferred to UMaine).
- 3) **US Army-Natick Contracting Division:** “Expeditionary Maneuver Support Materials and Structures – Natick Option 3” Duration: Dec 22- Dec 25; Total Amount: 5.28 million; Role: co-PI (10%); **Khoda’s Amount:** \$528,000.
- 4) **Maine Technology Institute:** “Data-driven innovations in agricultural production system: Wild Blueberry Case Study”, Duration: June 23-May 26; Total Amount: 1 million; Role: co-PI (35%); **Khoda’s Amount:** \$350,000.
- 5) **US Army-Natick Contracting Division:** “Expeditionary Maneuver Support Materials and Structures – Natick Option 2” Duration: Jan 22- Dec 25; Total Amount: 8.29 million; Role: co-PI (5%); **Khoda’s Amount:** \$414,244.
- 6) **US Army-Natick Contracting Division:** “Expeditionary Maneuver Support Materials and Structures - Option 2” Duration: Oct 19- Aug 22; Total Amount: 5.28 million; Role: co-PI (10%); **Khoda’s Amount:** \$527,686.
- 7) **US Army-Natick Contracting Division:** “Expeditionary Maneuver Support Materials and Structures – Natick Option 1” Duration: Oct 20- Oct 23; Total Amount: 1.89 million; Role: co-PI (10%); **Khoda’s Amount:** \$188,499
- 8) **NASA Seed Grant:** “Bioprinted blueberry plant cells as a multi-use product for long-term space exploration” Duration: Sep 22- Aug 23; Role: PI (25%); Total Amount: \$80,000.
- 9) **NSF #OIA-1355466 INSPIRE-ND Center for Sustainable Material Science (CSMS)** “Bio-based polymers and composites for additive manufacturing”; Duration: Sep 17-Sep, 19; **Khoda’s Amount: \$211,250**
- 10) **NIH-COBRE #P20GM109024 CDTSPC-** ‘Bio-manufacturing of cancerous pancreas tissue with controlled gradient hypoxia’ (Pilot Project); Duration: Dec 16-Mar, 17; Role: PI; **Khoda’s Amount: \$36,250.**
- 11) **NSF-DMR- MRI #1625704:** Acquisition of a high-resolution ultrasound imaging instrument for research and education; Duration: Sep 16-Sep, 19; Role: co-PI; Total Amount: \$251,750; PI and co-PIs: Sanku Mallik, Amanda Brook.

**12) Dept. of Commerce Research-ND Award # 17-08-G-191:** Additive Manufacturing for Mattress Comfort Customization; Duration: June 17-Aug, 18; Role: PI; Total Amount: \$64,000; **Khoda's Amount: \$32,000**; co-PI: Chad Ulven.

**13) Department of Defense:** High Performance Bio-based Polymers for Coatings and Additive Manufacturing; Duration: 01/01/2019 – 12/31/2021; Role: co-PI (25%); Chad A Ulven (PI). Total Amount: \$7,638,673.

### **3C. Successful Internal Funding (Total Amount: \$3,139,093; Khoda's Portion: \$309,908)**

#### **3C1. from UMaine:**

- NU & UMaine joint seed funding, 2021 **Amount: \$50,000 (Khoda's portion: \$25,000)**
- Mentee, EMPOWER mentoring program, 2021 **Amount: \$10,000**
- Bio-manufacturing Collaboration with Jackson Laboratory, 2021 **Amount: \$5,600**
- Bangor Savings Bank and Lyndon Paul LoRusso Faculty Development Award, 2019; **Amount: \$2000**
- UG Research Assistant Grant, Maine-EPSCoR- Duration: 2019; **Amount: \$6,600**

#### **3C2. from NDSU:**

- NDSU Research and Discovery Grand Challenge Initiative- 'Center for Engineered Cancer Test-beds' Duration: Nov 16-Nov, 19; Role: co-PI; Total Amount: \$2,974,693; **Khoda's Amount: \$154,908**; PI and coPIs: Kalpana Katti; Rajani Pillai; Nan Yu; Gregory Cook; Sanku Mallik; Dinesh Katti; Bashir Khoda; D.K. Srivastava; Mukund Sibi.
- NDSU Development Foundation Fund (total 4 grants)- Duration: 2014-2016; Role: PI; **Khoda's Amount: \$102,800.**
- ND Governor School Fund- Duration (total 4 grants): 2014-2017; Role: PI; **Khoda's Amount: \$11,600**

### **3D. Scholarly Publications**

#### **3D1. Book Chapters (2):**

1. B. Khoda, Chapter 2: Computer-Aided Design of Additive Manufacturing Components (Invited Book Chapter); Laser-Based Additive Manufacturing of Metal Parts: Modeling, Optimization, and Control of Mechanical Properties; Eds. Bian, L., N. Shamsaei, and J. Usher, Taylor & Francis 2017, ISSN# 1351647482.
2. B. Khoda, T.Benny, P. Rao, M. Sealy, and C. Zhou, Chapter 14: Applications of Laser-based Additive Manufacturing, in Laser-based Additive Manufacturing Processes (Invited Book Chapter); Laser-Based Additive Manufacturing of Metal Parts: Modeling, Optimization, and Control of Mechanical Properties; Eds. Bian, L., N. Shamsaei, and J. Usher, Taylor & Francis 2017, ISSN# 1351647482.

#### **3D2. Peer-Reviewed Journal Articles (31):**

\* *Maxwell Blais, A Habib, N Ahasan, A Alam, A Shovon, I. Khalil and Ruinan Xie* are Graduate Students

1. A. Alam, M hafizur, A. Zia, N. Lowrey, P. Chakraborty, Md. Hassan, and **B. Khoda**, "In-situ Particle Analysis with Heterogeneous Background: A Machine Learning Approach" 2024 Scientific Report (In-Press)
2. Habib, M., Sarah, R., Tuladhar, S., **Khoda, B.**, and Shah, L "Modulating Rheological Characteristics of bio-ink with component weight and shear rate for Enhanced Bioprinted Scaffold Fidelity" Bioprinting 2024; 38: e00332 doi.org/10.1016/j.bprint.2024.e00332.
3. I. Khalil, A. Islam, Dezhong Tong, Mohammad Jawed and B. Khoda. "Controlling surface of rods with entrained particle as asperities". Journal of Micro- and Nano-Manufacturing, 2024; 11(1): 011006 (8 pages) [doi.org/10.1115/1.4064646](https://doi.org/10.1115/1.4064646).

4. Tong, D., Ibrahim Khalil, M., Justin Silva, M., Wang, G., **Khoda, B.**, and Khalid Jawed, M. (November 16, 2023). "Mechanical Response of Fisherman's Knots During Tightening." ASME. *J. Appl. Mech.* March 2024; 91(3): 031008. <https://doi.org/10.1115/1.4063895>
5. Maxwell B., Scott Tomlinson and **B. Khoda**, "Investigation of the Interfacial Adhesion Strength of Parts Additively Manufactured on Fabrics." ASME Open J. Engineering ASME. January 2023 2 021024 doi: <https://doi.org/10.1115/1.4062281>.
6. **B. Khoda**, W. Gramlich, A. Shovon, and I. Khilail. "Effect of MW of PMMA on Particle Transfer by Dip Coating Process from Liquid Particle Carrier System", *Progress in Organic Coating* 2023, 176, p. 107394. <https://doi.org/10.1016/j.porgcoat.2022.107394>.
7. I. Khalil, Dezhong Tong, Guanjin Wang, Mohammad Jawed and **B. Khoda**, "Systematic Variation of Friction of Rods", *Journal of Applied Mechanics*, 2022, p.1-12. <https://doi.org/10.1115/1.4055544>.
8. A. Shovon, A. Alam, W. Gramlich and **B. Khoda**, "Micro-particle entrainment from density mismatched liquid carrier system." *Scientific Report*, 2022, 12, p. 9806. <https://doi.org/10.1038/s41598-022-14162-5>.
9. Habib, M. and **B. Khoda**, "Rheological Analysis of Bio-ink for 3D Bio-printing Processes." *Journal of Manufacturing Processes*, 2022, 76 p. 708-718 [doi.org/10.1016/j.jmapro.2022.02.048](https://doi.org/10.1016/j.jmapro.2022.02.048).
10. A. Alam, M. Rais-Rohani, K. Berube and **B. Khoda**, "Mechanical Performance of 3d Printed Lattice Structure: Assembled vs Direct Print." *3D Printing and Additive Manufacturing*, 2022, 0(0) p. 1-13 [doi.org/10.1089/3dp.2021.0207](https://doi.org/10.1089/3dp.2021.0207).
11. I. Khalil and **B. Khoda**, "Sorting of Poly-disperse Particle by Entrapment using Liquid Carrier System". *Journal of Manufacturing Science and Engineering*, 2022, 144(5) p. 054502 [doi.org/10.1115/1.4052440](https://doi.org/10.1115/1.4052440).
12. **B.Khoda**, AMMN. Ahsan, and A.N. Shovon, "Dip coating from density mismatching mixture". *Journal of Micro- and Nano-Manufacturing*, 2021, 9(2) p. 021003. [doi:10.1115/1.4051260](https://doi.org/10.1115/1.4051260)
13. **B. Khoda**, and AMM. Ahsan, "A novel rapid manufacturing process of metal lattice structure from continuous thin rod." *3D Printing and Additive Manufacturing*, 2021, 8(2), p. 111-125. [doi:10.1089/3dp.2020.0184](https://doi.org/10.1089/3dp.2020.0184).
14. **B. Khoda**, A.M.M.N. Ahsan, A.N. Shovon, and A.I. Alam, "3D metal lattice structure manufacturing with continuous rods." *Scientific Reports*, 2021, 11(1): p. 434. [doi:10.1038/s41598-020-79826-6](https://doi.org/10.1038/s41598-020-79826-6). [Top 100 materials science \*Scientific Reports\* papers in 2021](https://www.nature.com/articles/s41598-020-79826-6)
15. Meaders, C.L., M.K. Smith, T. Boester, A. Bracy, B.A. Couch, A.G. Drake, S. Farooq, **B. Khoda**, *et al*, "What Questions Are on the Minds of STEM Undergraduate Students and How Can They Be Addressed?" *Frontiers' in Education*, 2021, 6(28). [doi: 10.3389/feduc.2021.639338](https://doi.org/10.3389/feduc.2021.639338).
16. Habib, M. and **B. Khoda**, "Fiber Filled Hybrid Hydrogel for Bio-Manufacturing". *Journal of Manufacturing Science and Engineering*, 2020, p. 1-38. [doi: 10.1115/1.4049479](https://doi.org/10.1115/1.4049479).
17. Nazmul Ahsan, A.M.M. and **B. Khoda**, "Characterizing Novel Honeycomb Infill Pattern for Additive Manufacturing". *Journal of Manufacturing Science and Engineering*, 2020, 143(2). [doi: 10.1115/1.4048044](https://doi.org/10.1115/1.4048044).
18. A. Habib, & **B. Khoda**. "Development of clay based novel bio-ink for 3D bio-printing process". *Journal of manufacturing process*, 2019, 38 pp.76-87; [doi:10.1016/j.jmapro.2018.12.034](https://doi.org/10.1016/j.jmapro.2018.12.034).
19. M. A.Habib, Sanku Mallik, Sathish Venkatachalem, & **B. Khoda** "3D Printability of Alginate-Carboxymethyl Cellulose Hydrogel" *Materials*, 2018, 11(3) pp.454; [doi:10.3390/ma11030454](https://doi.org/10.3390/ma11030454).

20. AMM Ahsan, Ruinan Xie, **B. Khoda** "Heterogeneous topology design and voxel-based bio-printing", Rapid Prototyping Journal, 2018, 24(7), pp.1142-1154. **doi:10.1108/RPJ-05-2017-0076.**
21. A Habib, and **B. Khoda** "Support Grain Architecture Design for Additive Manufacturing", Journal of Manufacturing Processes, 2017, 29 pp. 332-342; **doi:10.1016/j.jmapro.2017.08.008.**
22. A Habib, and **B. Khoda** "Attribute driven process architecture for additive manufacturing", Journal of Robotics and Computer Integrated Manufacturing, 2017, 44 pp. 253-265; **doi:10.1016/j.rcim.2016.10.003.**
23. N Ahsan and **B. Khoda** "AM optimization framework for part and process attributes through geometric analysis", Journal of Additive Manufacturing, 2016, 11 pp. 85-96, **doi:10.1016/j.addma.2016.05.013.**
24. N Ahsan, A Habib and **B Khoda** "Resource based process planning for additive manufacturing," Computer-Aided Design, 2015, 69, 112-125. **doi:10.1016/j.cad.2015.03.006.**
25. **B Khoda** "Process Plan for Multi-Material Heterogeneous Object in Additive Manufacturing", Journal of 3D Printing and Additive Manufacturing, 2014, 1(4) pp. 210-218. **doi:10.1089/3dp.2014.0022.**
26. I.T Ozbolat and **B Khoda** "Design of a new Parametric Path Plan for Hollow Tissue Scaffolds with Functionally Graded Materials," ASME Journal of Computing and Information Science in Engineering 2014, 14(4), 041005. **doi:10.1115/1.4028418.**
27. **AKM Khoda.** and B. Koc, "Functionally Heterogeneous Porous Scaffold Design for Tissue Engineering", Journal of Computer Aided Design, 2013, 45(11): p. 1276–1293 **doi:10.1016/j.cad.2013.05.005.**
28. **AKM Khoda,** I.T. Ozbolat and B. Koc, "Designing Heterogeneous Porous Tissue Scaffolds for Additive Manufacturing Processes", Journal of Computer Aided Design, 2013, 45(12): p. 1507–1523. **doi:10.1016/j.cad.2013.07.003.**
29. **AKM Khoda,** and Bahattin Koc, "Designing Controllable Porosity for Multi-Functional Deformable Tissue Scaffolds" Journal of Medical Device, 2012, 6(3): 031003-1-12. **doi: 10.1115/1.4007009.**
30. I.T Ozbolat, **AKMB,Khoda,** J. Gardella, and B. Koc, , "Hybrid Tissue Scaffolds for Controlled Release Applications," Journal of Virtual and Physical Prototyping, 2012, 7(1): p. 37-47. **doi:10.1080/17452759.2012.668700.**
31. **AKM Khoda,** I.T. Ozbolat and B. Koc, "Modeling of Variational Gradient Porous Architecture with Multi-directional Filament Deposition in 3D Scaffolds." Journal of Computer Aided Design and Applications 2013. 10(3): p. 445-459. **doi:10.3722/cadaps.2013.445-459.**
32. **AKM Khoda,** I.T. Ozbolat and B. Koc, "A New Functionally Gradient Variational Porosity Architecture for Hollowed Scaffold Design." Journal of Biofabrication 2011. 3(3): p. 1-15. **doi: 10.1088/1758-5082/3/3/034106.**
33. **AKM Khoda,** I.T. Ozbolat and B. Koc, "Engineered Tissue Scaffolds with Variational Porous Architecture". ASME Transactions, Journal of Biomechanical Engineering, 2011, 133(1): pp.011001-12. **doi:10.1115/1.4002933.**
34. N.R. Dhar, **AKM Khoda,** P. Bala, and M.F. Karim "A Study of Effects of Acid Activated Saw Dust on the Removal of Different Dissolved Tannery Dyes (Acid Dye) from Aqueous Solutions" Journal of Environmental Science & Engineering 2005, 47(2): pp. 103-108.

### **3D3. Peer-Reviewed Journal Articles Currently Under Review or Ready for Submission (2)**

1. Y. Xu, Sarah, R., Habib, M., Y. Liu and **B. Khoda**,. “Constraint Based Bayesian Optimization for Bio-inks: A Machine Learning Framework” (Submitted to Bio-fabrication)
2. A. Alam, A. Shovon, I. Khalil, N. Ahsan, and **B. Khoda**,. “Wide gap TLP joining by dipping.” Advanced Joining Process (Draft Ready).

### **3D4. Peer-Reviewed Conference Papers in Proceedings (49):**

1. A. Alam, Md. Hassan, and **B. Khoda**, “Particle Analysis from Heterogeneous Background with Deep Learning Tool” MSEC, ASME, 2024
2. S. Tuladhar and **B. Khoda**, “Rheological Characterization of Algae infused Hydrogel Precursors” MSEC, ASME, 2024
3. A. Zia and **B. Khoda**, MOF-laden 3D printed monolithic filter design and manufacturing” MSEC, ASME, 2024
4. M. Lawrance, Scott Tomlinson and **B. Khoda**, “Finding Chain Nets of Solids Using Heuristic Hamiltonian Pathfinding Methods” IDETC, ASME, 2023.
5. P. Murphy and **B. Khoda**, “Application of a Continuous Variable Density Infill: Manipulating Center of Gravity” IDETC, ASME, 2023.
6. Maxwell B., Scott Tomlinson and **B. Khoda**,. “Investigation of the Interfacial Adhesion Strength of Parts Additively Manufactured on Fabrics.” Procedia Manufacturing MSEC, ASME, 2023.
7. A.N. Shovon, MI. Khalil, A. Alam and **B. Khoda**, “Effect of Withdrawal Velocity on Particle Entrainment from Density Mismatched Mixture” Procedia Manufacturing MSEC, ASME, 2022.
8. MI. Khalil, and **B. Khoda**, “Size-Based Filtration of Poly-Disperse Micro-Particle by Dipping” Procedia Manufacturing MSEC, ASME, 2022.
9. Maxwell B., Scott Tomlinson and **B. Khoda**, “Thermoplastics 3D Printing Using Fused Deposition Modeling on Fabrics” IMECE, ASME, 2021.
10. MA. Habib, and **B. Khoda**, “A Rheological Study of Bio-Ink: Shear Stress and Cell Viability” Procedia Manufacturing MSEC, ASME, 2021.
11. **B. Khoda**, A.M.M.N. Ahsan, and A.N. Shovon, “Solid Transfer of Large Particles by Dipping in a Heterogeneous Mixture” Procedia Manufacturing MSEC, ASME, 2021.
12. MA. Habib, Md Ahasan. and **B. Khoda**, “Fiber filled hybrid hydrogel for bio-manufacturing” Procedia Manufacturing MSEC, ASME, 2020.
13. N. Ahsan, MA. Habib, A. Shovon, A. Alam, and **B. Khoda**, “Design and manufacturing of lattice structure using extrusion-based additive manufacturing” Procedia Manufacturing MSEC, ASME, 2020.
14. N. Ahsan, MA. Habib, and **B. Khoda**, “Designing Short-fiber Filled Hybrid Hydrogel for BioManufacturing” IISE Annual Conference, IIE, 2020.
15. Habib, A. and **B. Khoda**, “Comparative Study on Long and Short Cellulose Fiber Filled Bio-ink”. IISE Annual Conference, 2019.
16. A Dey, N Yodo, **B Khoda**. “Optimizing Process Parameters under Uncertainty in Fused Deposition Modeling”, IISE Annual Conference, 2019.
17. Ahsan, A.M.M.N. and **B. Khoda**, “Feature Based Honeycomb Infill for 3D Printing”, IISE Annual Conference, 2019.
18. MA. Habib, and **B. Khoda**, “Effect of process parameters on cellulose fiber alignment in bio-printing” Procedia Manufacturing MSEC, ASME, 2019.
19. N. Ahsan, T. Ihrke, and **B. Khoda**, “Novel honeycomb infill fabrication pattern for additive manufacturing” Procedia Manufacturing, MSEC, ASME, 2019.
20. N. Ahsan, and **B. Khoda**, (2018). “Adaptive shape conforming honeycomb lattice infill for 3D printing of thin wall objects” SFF 2018.

21. MA. Habib, & **B. Khoda**, "Development of clay based novel hybrid bio-ink for 3D bio-printing process". Procedia Manufacturing, NAMRC, 2018.
22. R. Xie, C. Ulven, & **B. Khoda**. "Design and Manufacturing of Variable Stiffness Mattress". Procedia Manufacturing, NAMRC 2018.
23. Ahsan, A. N., & **B. Khoda**, "Honeycomb pattern on thin wall object with grain based 3D printing". Procedia Manufacturing NAMRC 2018.
24. Habib, M. A., & **B. Khoda**, "Assessing the printability of alginate-CMC hydrogels". IISE Annual Conference, 2018, (**Best paper award**, Manufacturing and Design Division, IISE 2018).
25. A. Ahsan, R. Xie, & **B. Khoda**, "Direct Bio-printing with Heterogeneous Topology Design". Procedia Manufacturing, NAMRC 2017.
26. A. Ahsan & **B. Khoda**, "Grain-based Support Structure Design for Additive manufacturing". Procedia Manufacturing, NAMRC 2017.
27. MA. Habib, A. Ahsan & **B. Khoda**, "Hierarchical Scanning Data Structure for Additive Manufacturing" Procedia Manufacturing, NAMRC 2017.
28. A. Ahsan, MA. Habib, & **B. Khoda**, "Process Plan Optimization for Minimum Build Time" IISE Annual Conference, 2016.
29. A. Ahsan & **B. Khoda**, "Concurrent Process Plan Optimization for Additive Manufacturing Using Genetic Algorithm" ISERC 2016.
30. A. Ahsan, MA. Habib, & **B. Khoda**, "Geometric Analysis for Concurrent Process Optimization of AM". Procedia Manufacturing, NAMRC 2016.
31. A. Ahsan, MA. Habib, & **B. Khoda**, "Optimizing Material Deposition Direction for Functional Internal Architecture in Additive Manufacturing Processes". Procedia Manufacturing, NAMRC 2015.
32. A. Ahsan, MA. Habib, & **B. Khoda**, "Resource based build direction in additive manufacturing processes" SFF 2014.
33. **B. Khoda**, "Build Direction with Improved Process Plan for 3D Heterogeneous Object" ISERC 2014.
34. **B. Khoda**, "Build Strategies for 3D Heterogeneous Object in Additive Manufacturing" ICMP 2014.
35. **B. Khoda**, "Build Direction for Improved Process Plan in Multi-material Additive Manufacturing". IDTEC 2014.
36. **AKM Khoda**, İT Özbolat, B Koc, "Functionally Gradient Tissue Scaffold Design and Deposition Path Planning for Bio-additive Processes" ISERC 2013.
37. **B. Khoda**, "Build Direction for 3D Heterogeneous Object in Layer Manufacturing" IMECE 2013.
38. **AKM Khoda**, İT Özbolat, B Koc, "Spatially multi-functional porous tissue scaffold" Procedia Engineering, ICTE2013.
39. **AKM Khoda**, B Koc, "Functionally Heterogeneous Porous Scaffold Design for Tissue Engineering" IMECE 2012.
40. **AKM Khoda**, İT Özbolat, B Koc, "Modeling of Porous Architecture with Anisotropic Pores and its Multi-directional Filament Deposition Path-plan" IMECE 2012.
41. I.T Ozbolat, **AKMB.Khoda**, J. Gardella, and B. Koc, "Bio-Additive manufacturing of hybrid tissue scaffolds for controlled release kinetics" IMECE 2012.
42. **AKM Khoda**, B Koc, "Designing Bio-mimetic Variational Porosity in Tissue Scaffolds" ISERC 2012.
43. **AKM Khoda**, B Koc, "Modeling of Multifunctional Deformable Porous Scaffolds for Soft Tissue Engineering" ISERC 2012.

44. **AKM Khoda**, B Koc, "Multi-Functional Variational Porosity in Bone Tissue Scaffolds" PROMED 2012.
45. I.T Ozbolat, **AKMB, Khoda**, and B. Koc, "Conformal Tissue Scaffold with Multi-Functional Porosity for Wound Healing" PROMED 2012.
46. **AKM Khoda**, B Koc, "Deformation Modeling of Soft Tissue Scaffolds for Wound Healing" IMECE 2011.
47. **AKM Khoda**, İT Özbolat, B Koc, "Modeling and Fabrication of Hollowed Scaffolds with Interconnected Variational Porosity Architecture" IMECE 2011.
48. **AKM Khoda**, B Koc, "Modeling Continuous Path Planning for Functionally Gradient Hollowed Tissue Scaffolds" IERC 2011.
49. **AKM Khoda**, B Koc, "Spatially Varying Porosity with Continuous Path Plan for Hollowed Tissue Scaffolds" VARP 2011.
50. I.T Ozbolat, **AKMB, Khoda**, and B. Koc, "Heterogeneous Tissue Scaffolds for Spatiotemporally Controlled Release Kinetics" VARP 2011,.
51. **AKM Khoda**, İT Özbolat, B Koc, "Toolpath Optimization in Solid Freeform Modeling and Fabrication for Tissue Engineering" IERC 2010.
52. **AKM Khoda**, İT Özbolat, B Koc, "Geometric Modeling of Complex Tissue Engineering Scaffolds with Controlled Porosity Distribution", IERC 2009.

**3D5. Peer-Reviewed Conference Abstracts:**

1. Rational design of an artificial weed for high-throughput soil bin physical weed control tool testing. Weed Science Society of America Annual Meeting, Arlington, VA 2023.
2. Systematic Variation of Friction of Rods, SES, 2022.
3. Micro-particle entrainment from density mismatched liquid carrier system, SES, 2022.
4. Inorganic micro-particles transfer from liquid carrier system by dipping, Society of Rheology, 2021.
5. Thermoplastics 3D Printing Using Fused Deposition Modeling on Fabrics, ICAM 2020.
6. Solid transfer of large particles by dipping in a heterogeneous mixture, SES 2020.
7. Comparative Study on Long and Short Cellulose Fiber Filled Bio-ink, ISERC-IISE 2019.
8. Partial Contact Based Support Architecture Design for Additive Manufacturing, SFF 2018.
9. Adaptive Shape Conforming Honeycomb Lattice Infill for 3D Printing of Thin Wall Objects, SFF 2018.
10. STL Free Additive Manufacturing, ISERC 2017.
11. Grain-based Support Structure Design and Generation in Additive Manufacturing, ISERC 2017.
12. Designing and Manufacturing Heterogeneous Porous Internal Architecture of Bio-models, ISERC 2017.
13. Additively Manufactured Cellular Structure Design and evaluation for Anti-Deformation Mechanism, ISERC 2017.
14. Designing and 3D Printing Customizable Shoe (Poster), ND EPSCoR 2016 conference.
15. 3D Printed Tablet: A Newer Approach to Patient-specific Medicine Delivery (Poster), ND EPSCoR 2016 conference.
16. 3D Printed (Mesoscale) Cellular Structure; ND EPSCoR 2015 State Conference.
17. Deposition Direction in Additively Manufactured Part with Features, ISERC 2015.
18. Spatial Comfort Design for Additively Manufactured Shoe, ISERC 2015.
19. Modeling and Fabrication of Functionally Gradient Variational Pore in Hollowed Scaffolds with Continuous Path Plan, TERMIS-EU 2011.
20. Computational Modeling of Effective Porosity for a Multi-Functional Porous Tissue Scaffolds/Membrane, International Conference on Biofabrication, 2010.



### **3D6. Invited Seminars/Presentations**

1. Invited Talk 'Space Agriculture for Long-term Space Exploration', UMaine Space Launch, May 2023.
2. Invited Seminar '3D printing in space', NASA M-STTR Virtual Symposium Series part -I, Dec 2022.
3. Invited Seminar 'Research scope and challenges in 3D printing', Mechanical Engineering Department, Dhaka University of Engineering and Technology, July, 2022.
4. Invited Seminar 'Particles Delivery by Dip Coating: A New Additive Manufacturing Process', Mechanical Engineering Department, University of Maine, Sep, 2021.
5. Invited Webinar, Manufacturing and Design Division, Industrial and Systems Engineers (M&D-IISE) 'Printability of hybrid hydrogels: An Assessment for Bio-ink' Feb, 2019
6. Invited Talk "Digital Manufacturing: Pixelization to Voxelization" Mechanical Engineering Department, University of Maine, June 2018.
7. Early Career Invited Talk "Performance Driven Cellular Architecture with Manufacturable Topology" Southwest Emerging Technology Symposium (SETS), UT El Paso, April 2018.
8. Invited Presentation "Digital Manufacturing" Military Institute of Science and Technology, Dhaka, Bangladesh, Dec 2017.
9. Invited Presentation "Bio-Additive Manufacturing" FM-AM Rotary Club, March 2016.
10. Invited Presentation "Additive Manufacturing: The Future" FM-PM Rotary Club, Feb 2016.
11. Invited Poster Presentation "Finding Pathways from NSF-Funded Basic Research to DOE-Funded Applied Research on Additive Manufacturing" NSF/DOE, 2015
12. Invited Presentation "Designing Spatial Comfort for Additively Manufactured Shoe" at ISERC 2015, Nashville, TN
13. Seminar Speaker: "Resource-Based Process Planning for Additive Manufacturing", Nov, 2015, Department of Mechanical Engineering Seminar, NDSU.
14. Seminar Speaker: "Additive Manufacturing", March, 2014, Department of Industrial and Manufacturing Engineering Seminar Series, NDSU.
15. Keynote Speaker: "Additive Manufacturing: Our Potentials", Oct, 2014, Library 3D Printing Open House, NDSU.
16. Interviewed by "Prairie Public Broadcasting" on bio-manufacturing research in Nov, 2014.
17. Seminar Speaker: "Modeling and Development of Multi-Functional Tissue Scaffolds with Additive Manufacturing", Sep, 2013, Department of Civil and Environmental Engineering Seminar Series, NDSU.

### **3D7. Patent Applications**

1. US Patent 11752534, 2023 Automatic Metal Wire Bending (AMWB) Apparatus to Manufacture Shape Conforming Lattice Structure with Continuum Design for Manufacturable Topology (Inventor and Contribution: **Bashir Khoda**, Md. Ahasan Habib, Amm Nazmul Ahsan and Ruinan Xie) (Granted: Sep 12, 2023).
2. U.S. Provisional Patent Application, A high-throughput continuous particle sorting apparatus. Inventor: **Bashir Khoda** (Application Date: Mar 20, 2023, by UMaine).

3. U.S. Provisional Patent Application, In-situ Particle Analysis with Heterogeneous Background: A Machine Learning Framework. Inventor: **Bashir Khoda**, Prabuddha Chakraborty, Md Rafiul Hassan, Adeeb Ibne Alam, MD Ibrahim Khalil, Md Hafizur Rahman (Application Date: May 20, 2023, by UMaine).
4. U.S. Provisional Application Robust water/oil separation via co-design of functionalized 3D printing lattice composites. Inventor: Zhibin Lin, **Bashir Khoda**, Long Jiang, Andrew Mahoney, Adeeb Ibne Alam, Xingyu Wang, Hong Pan (Submission Date: Oct 19, 2021, by NDSU).
5. U.S. Patent Application, A quick and effective method of polydisperse particle sorting by dipping. Inventor: **Bashir Khoda**, Abu Shovon, Ibrahim Khalil and Adeeb Alam (Application Date: May 8, 2023, by UMaine).
6. NDSU RFT-485 – MRG Ref. No. 255.00450160, U.S. Provisional Application No. 62/156,681 Nanoparticles for Delivery of Encapsulated Contents and Methods of Use (Inventor and Contribution: Prajakta Kulkarni (40%), Manas Haldar (15%), Sanku Mallik (25%), **Bashir Khoda** (10%), Md. Ahasan Habib (5%), Amm Nazmul Ahsan (5%)) (Provisional patent issued 2016).

### **3D8. Research Community Related Services**

- 1) Editorial board member, Scientific Report 2023-
- 2) Faculty mentor, Mechanical Engineering Department at UMaine 2023-.
- 3) Reviewer Panelist for NSF-CMMI: 2014, 2016, 2017, 2021, 2022
- 4) Proposal Reviewer (i) GAIN-CRP SC EPSCoR (2024) (ii) Dutch Research Council (NWO)- Vidi Grants (2022) (iii) DoD/SERDP 2017 (iv) Polish National Science Center (2015).
- 5) Judge, Maine State Science Fair (MSSF), 2023, 2024
- 6) Invited member, Engineering Research Visioning Alliance (ERVA), Engineering R&D Solutions for Unhackable Infrastructure, MIT 2022.
- 7) Advisory board members, MIST International Journal of Science and Technology (MIJST), 2021-.
- 8) External collaborator, Industrial Engineering program at University of Southern Maine (USM), 2022-
- 9) Symposium Organizer on Porous Structure Manufacturing, ASME-MSEC 2020, 2021,2022.
- 10) Advisory Group Member, Workforce and Educational Outreach (WEO) Committee, America Makes (2017).
- 11) Served IIE Manufacturing & Design Service Award Committee (IIE 2016).
- 12) Conference Committee member, IEOM Orlando, USA, September 10 - 11, 2015.
- 13) Judge, NSF Poster Symposium at the ASME IMECE 2013.
- 14) Host committee Biomimetics, Artificial Muscles and Nano-Bio 2019 (BAMN 2019) International Congress
- 15) Host committee for CAD'12 conference.
- 16) Session Chair: Process, Property, Performance Relationship in Additive Mfg. 1, NAMRC 44.
- 17) Session Chair: CAD/CAM Topics in Additive Manufacturing 1, NAMRC 44.
- 18) Session Chair "Digital Modeling and Manufacturing - I Additive Manufacturing" ISERC 2014, Montreal, Canada.
- 19) Journals/Publications Reviewed: JMP, JMS, CAD, RCIM, RP, Computational Design and Engineering, Journal of Bio-fabrication, 3D printing and Additive Manufacturing, Journal of Manufacturing Science and Engineering, IIE-ISERC, ASME-IMECE, ASME-IDETC, SME-NAMRC, SFF Symposium, Scientific Report.

### **3D9. Honors, Awards, and Certifications**

1. Panel Fellow, 2023 NSF CMMI's Game Changer Academies (CGCA).
2. Nominated for Mel McClure Global Community Impact Award, UMaine 2023.
3. Professional certificate program "Predictive Multiscale Materials Design", MIT Campus, June 12-16, 2023.
4. Nominated for faculty mentor impact award, UMaine 2019.
5. Best Paper Award Recipients Manufacturing and Design Division, IIE 2018.
6. Winner, America Makes Innovation Sprint: Additive Manufacturing Curricula Challenge, 2017
7. Best Paper Award Recipients (Third Place) Manufacturing and Design Division, IIE 2014.
8. NSF Funded Gateways-ND Cohort 2 Program, Office of Teaching and Learning (2 year teaching methodology project).
9. National Effective Teaching Institute (NETI-1) certificate achieved, Jan 2016.
10. Carl A and Jean Y. White Agricultural Research Award, NDSU 2016-2017
11. Received Development Foundation Grant to establish Additive Manufacturing Lab at NDSU (Sep, 2014).
12. Received "Gordon A. Larson Agricultural Research Award" NDSU 2014 and 2015.
13. University Gold Medalist 2007 (Graduate Student) BUET.
14. Dean's List Award, Undergraduate Studies, BUET (2004).

#### **4. Teaching and Pedagogy Activities**

Objective: My near-term teaching objectives are to contribute to the department by teaching several required classes and ensure continuous improvement of the classes that I currently am teaching.

#### **4A. Courses Taught (100% Responsibility)**

##### **4A1. At UMaine:**

##### **Course Title: MEE 430 Digital Manufacturing**

Innovation or enhancement introduced: Project based hands-on learning

First/Last Taught: Spring 2022/ Fall 2023

No. of Times Taught: 2

No. of Students: 36

Avg. Instructor Rating: 4.75/5.0

##### **Course Title: MEE 330 Manufacturing Engineering**

Innovation or enhancement introduced: Developed new course and laboratory, implemented project-based learning.

First/Last Taught: Spring 2020 / Fall 2023

No. of Times Taught: 4

No. of Students: 184

Avg. Instructor Rating: 3.56/5.0

##### **Course Title: MEE 101 Research Learning Experience (RLE) (co-teaching)**

Innovation or enhancement introduced: Organized and led a 3-week research module tied to additive manufacturing

First/Last Taught: Fall 2021

No. of Times Taught: 1

No. of Students (Total): 12

Avg. Instructor Rating: Very Good

**Course Title: MEE 150 Engineering Mechanics: Statics**

Innovation or enhancement introduced: Exercised active learning, buddy activity, problem-solving with groups.

First/Last Taught: Spring 2019 / Spring 2023

No. of Times Taught: 7

No. of Students (Total): 262

Avg. Instructor Rating: 4.24/5.0

**Course Title: MEE 697 Mechanical Engineering Projects**

Innovation or enhancement introduced: Developed advanced manufacturing research topics.

First/Last Taught: Spring 2021

No. of Times Taught: 1

No. of Students: 3

Avg. Instructor Rating: n/a

**Course Title: MEE 487/488 Capstone Design I & II**

Innovation or enhancement introduced: Implemented hybrid manufacturing project.

First/Last Taught: Fall 2020/ Spring 2021

No. of Times Taught: 2

No. of Students: 7

Avg. Instructor Rating: n/a

**Course Title: MEE 498/499 Honors Directed Study**

Innovation or enhancement introduced: Introduced bio-manufacturing research experience to the undergraduate student.

First/Last Taught: Fall 2020/ Spring 2021

No. of Times Taught: 2

No. of Students: 1

Avg. Instructor Rating: n/a

**4A2. At NDSU:**

**Course Title: IME 380 CAD/CAM for Manufacturing**

Innovation or enhancement introduced: Developed new laboratory, implemented project-based learning and 3D Printing.

First/Last Taught: Fall 2013 / Fall 2018

No. of Times Taught: 5

No. of Students: 123

Avg. Instructor Rating: 3.21/5.0

**Course Title: IME 482/682 Automated Manufacturing Systems**

Innovation or enhancement introduced: Developed new laboratory, problem-solving with groups.

First/Last Taught: Fall 2015 / Fall 2018

No. of Times Taught: 4

No. of Students: 185

Avg. Instructor Rating: 3.07/5.0

**Course Title: IME 485/685 Industrial and Manufacturing Facility Design**

Innovation or enhancement introduced: Developed new course, problem-solving with groups, implemented project-based learning.

First/Last Taught: Spring 2014 / Spring 2018

No. of Times Taught: 5

No. of Students: 170

Avg. Instructor Rating: 3.27/5.0

**4A3. At University at Buffalo:**

**Course Title: IE 406/506 Computer-Integrated Manufacturing**

First/Last Taught: Fall 2011 / Fall 2012

No. of Times Taught: 2

No. of Students: 48

**Course Title: IE 327 Facility Design and Material Handling**

First/Last Taught: Spring 2013

No. of Times Taught: 1

No. of Students: 47

**4A4. At Bangladesh University of Engineering & Technology:**

**Course Title: IPE 104 Engineering Drawing I**

First/Last Taught: Spring 2006

No. of Times Taught: 1

No. of Students: 28

**Course Title: IPE 204 Engineering Drawing II**

First/Last Taught: Spring 2007

No. of Times Taught: 1

No. of Students: 28

**Course Title: IPE 205 Manufacturing Process I**

First/Last Taught: Spring 2005/ Spring 2006

No. of Times Taught: 2

No. of Students: 57

**Course Title: IPE 305 Manufacturing Process II**

First/Last Taught: Fall 2005/ Fall 2006

No. of Times Taught: 2

No. of Students: 50

**Course Title: IPE 331 Production Process**

First/Last Taught: Fall 2005/ Fall 2006

No. of Times Taught: 2

No. of Students: 240

**Course Title: IPE 493 Industrial Management**

First/Last Taught: Spring 2007

No. of Times Taught: 1

No. of Students: 60

**4B. Courses and Lab Assisted as Teaching Assistant**

**2007-2011**

*University at Buffalo, Industrial and Systems Engineering Department, Buffalo, NY*

- i. IE 409/509 (Six Sigma Quality Control);
- ii. IE 584 (Computer-Aided Bio-modeling & Fabrication in Biomedical Eng);
- iii. IE 320 (Engineering Economy);
- iv. IE 406/506 (Computer Integrated Manufacturing);
- v. IE 327 (Facility Design & Material Handling);
- vi. IE 504 (Facility Design)

**4C. New Courses Developed**

**4C1. at UMaine:**

MEE430: Digital Manufacturing (Spring 2022)

This hybrid course is developed as an undergraduate tech elective and a core course for smart manufacturing graduate concentration at UMaine. The course focuses on various components of DM and their interplay; design and manufacturing information type, their collection, analysis, and utilization. Additionally, additive manufacturing (AM) or 3D printing, a popular tool for DM implementation, will be covered. The topics include process science, design evaluation, material consideration, part characterization, manufacturing data collection, and the economic impact of AM.

MEE330: Manufacturing Engineering (Spring 2020)

This is a core course developed for the undergraduate (Junior) students in the MEE department and is focused on the tools required for innovation in production systems (Concept-Design-Analysis-Prototyping/Manufacturing-Evaluation). The objective of this course is to develop an understanding of the principles of design and manufacturing for the application of product development processes. The syllabus is designed to make this course a 'project-based learning' and the content helps students prepare for the FE exam. In Spring 2021, a new laboratory component was assembled and offered to ensure hands-on activities. The projects are designed to provide the basic concept of manufacturing with the combination of computations and experimentations. Based on the evaluation comments, students found the class valuable for their future career growth. One student comment: "Helped me prepare for the FE. The hands-on projects were very beneficial." I found it very encouraging.

MEE101: Research Learning Experiences (RLE) (3D Printing Module) (Fall 2021)

Research learning experiences (RLE) course is a new initiative for the incoming first-year students. The goal of this course is to develop a broad understanding of the field of mechanical engineering through active participation in analysis, experimentation, exploration, and discovery. I developed the three-week module on 3D printing.

MEE 530: Digital Manufacturing (Spring 2023)

I am currently working on a graduate-level manufacturing systems engineering course and my plan is to submit the syllabus to GEAC by the end 2022. This is a core course for the Smart Manufacturing graduate concentration (serving as coordinator) recently approved by UMS.

**4C2. at NDSU:**

IME 485/685 Facility Design and Layout

This is a core course for undergraduate students in the IME department and is focused on different facility design methodology and layout algorithms, including industrial engineering tools. This course focuses on facilities planning, emphasizing the design, analysis, and selection of manufacturing/service facilities and material handling systems. The topics covered include facilities planning, the role of the production process and schedule design, the relationship among flow, space, and activity. Students also learn how to determine and utilize the space requirements for personnel and equipment.

**4D. New Laboratory Developed and Upgraded**

**4D1. at UMaine:**

1. **Bio-Manufacturing laboratory.** Currently, I am working with the bio-medical engineering department and sharing facilities for bio-manufacturing research. I am co-advising one Ph.D. student and one master's student in biomedical science and engineering. Simultaneously, with graduate students, I am building a bio-manufacturing lab here at UMaine with a suitable space (BSL2) that can support my research activities. My goal is to study the bio-activity of a newly developed bio-ink consist of

alginate, Carboxymethyl cellulose, and freeze-dried TOCN with various cell types (living cell, i.e., BXPC3, porc 1, MSC, HEK 293).

2. **Digital Manufacturing Laboratory.** A new advanced manufacturing laboratory is under construction to support student learning and research at UMaine. The laboratory space is on the 2nd floor of the AMC building and will be used by undergraduate and graduate students for conducting research. The lab is currently housing the wire bending apparatus and systems.

#### **4D2. at NDSU:**

1. **Additive Manufacturing laboratory.** A new additive manufacturing laboratory is developed to support student learning and research at NDSU. Four different AM process equipment, three different 3D scanners, post-processing work-bench, were acquired using various funds granted to Khoda. The laboratory (Dolve 137) is used by both undergraduate and graduate students for their classes, projects including capstone, various student competitions, and research. Dr. Khoda secured funding from multiple sources for establishing this laboratory.
2. **Automation laboratory.** A complete renovation of the automation laboratory in the IME department was accomplished in Fall 2016. Automation equipment design and selection, syllabus planning, laboratory layout was performed during this process. A laboratory development grant from the provost's office was utilized for this development.
3. **Bio-Manufacturing Laboratory.** A new bio-manufacturing research laboratory is developed by Dr. Khoda to support the research work. The laboratory contains a 400sqft 10000 level cleanroom where the bio-manufacturing research is conducted. The remaining part of this lab contains digital manufacturing-related equipment and supplies. The equipment was purchased using various research grants secured by Khoda.

#### **4E. Student Advising**

##### **4E1a. Graduate Research Advisee (UMaine):**

1. Nirav Mehta (Ph.D.); Tentative Title: Generative design methodology for wild blueberry harvesting Equipment. Completion date (Tentative): 12/26; Role: Advisor.
2. Fatin Ishraq(Ph.D.); Tentative Title: Agriculture 4.0: A GNN based approach for wild blueberry case. Completion date (Tentative): 12/26; Role: Advisor.
3. Akhter Zia (Ph.D.); Tentative Title: Multi-scale porous structure for PFAS removal. Completion date (Tentative): 12/24; Role: Advisor.
4. Akibul Islam (Ph.D.); Tentative Title: Liquid carrier system design for entrapment. Completion date (Tentative): 12/26; Role: Advisor.
5. Slesha Tuladhar (M.S.); Tentative Title: Spheroid based bio-manufacturing for plant cell. Completion date (Tentative): 6/24; Role: Advisor.
6. Patrick Murphy (M.S.); Tentative Title: Topology optimization ensuring printability. Completion date (Tentative): 12/23; Role: Advisor.
7. Matt Lawrence (M.S.); Tentative Title: Interfacial strength of additively manufactured heterogeneous object. Completion date (Tentative): 5/24; Role: Advisor.
8. Ibrahim Khalil (M.S.); Title: Application of particle transfer by dipping using polymer binder. Completion date: 06/23; Role: Advisor.
9. Maxwell Blais (M.S.); Title: Thermoplastics 3D printing using fused deposition modeling on fabrics. Completion date: 09/22; Role: Advisor.

10. Abu Naser Shovon (M.S.); Title: Micro-particle entrainment from density mismatching mixture by dip coating process. Completion date: 8/22; Role: Advisor.
11. Adeb Alam (M.S.); Title: Additively manufactured polymer and metal lattice structure with eulerian path. Completion date: 8/22; Role: Advisor.
12. Aimee Co (M.S.); Tentative Title: Development of a new method for cell spheroid formation through a hydrogel dipping process. Completion date: 05/22; Role: Co-Advisor (with Profs. Mason and Tilburry in Biomedical Eng. program).
13. Sunil Bhandari (Ph.D.); Title: Topology optimization of 3D printed object. Completion date: 12/21; Role: Committee Member.
14. James Anderson (IPh.D.); Title: IPHD Research Topics: Large format thermoplastic additive manufacturing - influence of layer orientation and overhang angle on part properties and processing costs. Completion date (Tentative): 6/24; Role: Committee Member (School of Forest Resources).
15. Chase Flaherty (M.S.); Tentative Title: "Feasibility of polymer extrusion welding as a joining application for segmented large-scale additively manufactured thermoplastic tooling structures" Completion date: 6/23; Role: Committee Member.
16. Philip Bean (Ph.D.); Tentative Title: "FEA Optimizations of 3D printed parts with spatially varying infills" Completion date (Tentative): 6/24; Role: Committee Member.

**4E1b. Undergraduate Research Advisee (UMaine):**

1. Jordyn Judkins; Title: Optimization of bio-ink for 3D bio-printing. Completion date: 12/21; Role: Major Advisor.

**4E2. Graduated Students as Major Advisor (at NDSU):**

1. Md. A Habib (Ph.D.); Title: Designing bio-ink for extrusion-based bioprinting process. Completion date: 6/19; Current Position: Tenure Track Assistant Professor at Keene State, NH.
2. AMM Nazmul Ahasan (Ph.D.); Title: Form and Functionality of Additively Manufactured Parts with Internal Structure. Completion date: 6/19; Current Position: Tenure Track Assistant Professor at Western Carolina University, NC.
3. Ruinan Xie (M.S.); Title: Design and Manufacturing of Variable Stiffness Cellular Architecture. Completion date: 6/17.

**4E3. Undergraduate Research Assistant (UMaine):**

Brandon Johnstone (2019- 2020); Brad Wilkins (Summer, 2019), Ben Snowiss (2019-)

**4E4. Undergraduate Research Assistant (NDSU):**

- Research Assistant: Triston Ihrke (2018- Present); Cody Wiese (2014-2018); Zelin Zhang (2017-present); Josh Laxen (Spring 17); Jared Sand (2014-15); Steven Giesler (CE, 2016-2017)
- Research Support: David Syverson and his team (Food Science, Spring 17)
- Participating in NAE Grand Challenge Program: Erik Milender.

**4F. Personal/professional development to improve teaching effectiveness**

1. Introductory Course Environment - Faculty Learning Community (ICE-FLC) hosted by the Center for Innovation in Teaching and Learning (CITL), UMaine. Cohort 2, 2019-2020.
2. Peer-Reviewed Formative Review Process, hosted by the office of teaching and learning (OTL), NDSU. 2014-2018.
3. National Effective Teaching Institute (NETI-1B) workshop. San Diego, 2016.
4. NSF-funded two-year professional development Gateways-ND project (Cohort 2). 2016-2018.



#### **4G. Committee Services (Teaching)**

1. Advisor, Industrial Engineering Curriculum Development program at University of Southern Maine (USM), 2021-2022
2. Member, CoE Bio-based Mfg/LCA Cluster hire white paper committee, UMaine 2020
3. Member, Research Advancement and Advisory Committee (RAAC) 2019, MEE UMaine.
4. Lead, Material and Manufacturing Core Research Group 2019, MEE UMaine.
5. Academic affairs committee, CoE NDSU 2016-2018.
6. Chair, Manufacturing Course/Curriculum Alignment committee 2016-2018, IME NDSU.

#### **5. Professional Services**

##### **5A. Book Proposals or Chapters Reviewed**

1. Book Proposal: "Additive Manufacturing, 2<sup>nd</sup> Ed", CRC Press 2017.
2. Reviewer, Book chapter "Chapter 9 - Process Optimization" Laser-based Additive Manufacturing Processes; Eds. John Usher and Linkan Bian. Springer 2017
3. Reviewer, Book chapter "Chapter 10 - Process Monitoring and Control" Laser-based Additive Manufacturing Processes; Eds. John Usher and Linkan Bian. Springer 2017
4. Book Proposal: "Additive Manufacturing Technology", McGraw-Hill 2016.
5. Book Proposal: "Additive Manufacturing of Metals" Edited by Dr. Andrzej L. Wojcieszynski; Springer 2014.

##### **5B. Community Outreach Activities**

1. Faculty advisor, 3D printing club, The largest student club of the UMaine System. 2019-
2. Member, Organizing committee Biomimetics, Artificial Muscles and Nano-Bio (BAMN) 2019, Bangor, ME.
3. Coach, FLL Lego League 'Regal Eagle Team 2017-2019' from Eagle Elementary School, Fargo.
4. Mentor, Sunday Academy on Advanced Manufacturing through the NSF supported NATURE program for American Indian high school, 2016-2018.
5. Interviewed with Impact magazine about Fargo Life, 2016.
6. Hosting three high school students from the 'ND Governor School Program' for 6 weeks every summer research project. (Featured news in July 2014 at NDSU homepage)
7. Guest Lecturer for "Geometry and Packaging" to high school Geometry students at Sheyenne High School, Fargo, 2014.
8. Offered advanced manufacturing awareness seminars to various interested parties, i.e., the Rotary Club and local industries.

##### **5C. Other Professional Activities**

1. Member of the Institute of Industrial Engineering (IIE); American Society of Mechanical Engineers (ASME); Society for Manufacturing Engineers (SME).
2. Search committee member, Tenure track assistant professor MEE, UMaine 2022, 2023.
3. Judge, Student Research Symposium at UMaine, Sep 2020
4. Judge, Graduate Student Council (GSC) Research Symposium at NDSU, April 2018
5. Search committee member, Tenure track assistant professor (total four positions) IME, NDSU: 2014-15, 2015-15, 2016-17 and 2017-18
6. Search committee member, IME Chair Search, 2016-17; CoE Dean search NDSU, 2016-17