

BINIL STARLY

James T. Ryan Professor in Industrial & Systems Engineering
915 Partners Way, Edward P. Fitts Department of Industrial and Systems Engineering
North Carolina State University, Raleigh, NC 27695
Data Intensive Manufacturing Environment (DIME) Laboratory, <http://www.dimelab.org>

EDUCATION

University of Kerala, India	Mechanical Engineering	B.S., 2001
Drexel University, Philadelphia, USA	Mechanical Engineering	Ph.D., 2006

APPOINTMENTS

2018 – present	Tenured Professor	James T. Ryan Professor (2020 - 2024), Industrial & Systems Engineering, North Carolina State University
2017 – 2019	Co-Director	Functional Tissue Engineering Group, Comparative Medicine Institute
2013 – 2018	Tenured Associate Professor	Edward P. Fitts Department of Industrial and Systems Engineering, North Carolina State University, Raleigh, NC.
2012 – 2013	Tenured Associate Professor	Industrial and Systems Engineering, University of Oklahoma, Norman, Oklahoma.
2010 – 2012	R&D Director	SEAM Aero, LLC, Norman, OK. (Co-Founder)
2006 – 2012	Tenure Track Asst. Professor	Industrial and Systems Engineering, University of Oklahoma, Norman, Oklahoma.
2002 – 2006	Research Assistant	Mechanical Engineering and Mechanics & Rapid Product Development Center, Drexel University, Philadelphia, PA.

RESEARCH AND TEACHING INTERESTS

Research

- AI in Manufacturing
- Cyber-Physical Systems in Manufacturing
- Decentralized Manufacturing Marketplaces
- Biofabrication Platforms for Personalized Biomedical Implants/Scaffolds

Teaching

- Product Development and Rapid Prototyping
- Digital Design and Manufacturing
- Additive Manufacturing
- Numerical & Scientific Computing with Python for Engineers
- Smart Manufacturing

HONORS AND AWARDS

Technical Society, National and International Awards

SME Blue Sky Vision Finalist, 2021

SME Journal of Manufacturing Systems Reviewer of the Year, 2021

SME “20 Most Influential Professors in Smart Manufacturing”, 2020

Society of Manufacturing Engineering (SME) - 2011 Young Manufacturing Engineering Award

NASA TechBrief 2010 Award, “Micro-organ device”
NSF CAREER Award, 2009
SME Dick Aubin Distinguished Paper Award, RAPID 2008

University and Department Awards (University of Oklahoma and NC State)

NC State University “Outstanding Teaching Award”, 2021
ISE Outstanding Research Award, 2021
James T. Ryan Professorship, 2020 - 2024
NC State ISE Clifton Anderson Outstanding Faculty Award, 2018
University of Oklahoma Alumni Teaching Award, 2007, 2008, 2009
University of Oklahoma Teachers Scholars Initiative (TSI) Colloquium award, 2010

Graduate Student Awards:

Most Likely to Enhance Drexel’s Reputation Award, 2006
Graduate Research Excellence, Drexel University, 2006
George Hill Jr. Fellowship, College of Engineering, Drexel University, 2005-2006
Graduate Research Award, College of Engineering, Drexel University, 2006
Teaching Excellence Award, Drexel University, 2005
Outstanding Service Award, Mechanical Engineering and Mechanics, Drexel Univ. 2006
Joseph E. Caroleone Award for Academic Merit, 2004-2005.

TECHNICAL SKILLS

CAD/CAM/PLM:	PTC Creo, SolidWorks, Autodesk Product Design Suite (Fusion 360)
Analysis & Simulation:	ANSYS, STARCD, COMSOL, ABAQUS
Programming Skills:	Python(NumPy, Pandas, SciPy, OpenCV, PyTorch, Django) , Matlab, MEAN Web Programming Stack, Robot Operating System(ROS)
Reverse Engineering:	Laser Scanners (LEICA, FARO, Konica, HandyScan), Geomagics, MIMICS
3D Printing Systems:	Binder based Powder Bed, Polymer Extrusion and UV Photopolymer Systems

BOOKS & BOOK CHAPTERS

1. **B. Starly**, R. Shirwaiker, “Three-Dimensional Bioprinting Techniques”, Book Chapter in 3D Bioprinting and Nanotechnology in Tissue Engineering, L. Zhang, J. Fisher and K. Leong (ed.), Elsevier, 2015, ISBN: 978-0-12-800547-7.
2. **B. Starly**, “Computer-Aided Process Planning for the Layered Fabrication of Porous Scaffold Matrices”, Book Chapter in Printed Biomaterials, Roger Narayan and Y.S. Lee., Springer Verlag, New York 2010, ISBN: 978-1-4419-1394-4.
3. **Starly, B.** and Sun, W., “Biomimetic Design and Fabrication of Tissue Engineered Scaffolds”, VDM Verlag, 2007, ISBN: 978-8364-2464-6.

PEER REVIEWED JOURNAL PUBLICATIONS

4300+ citations recorded by Google Scholar, h-index 26

<https://scholar.google.com/citations?user=o12GBQMAAAAJ&hl=en>

**Bold Underline indicates contact author status. Dr. Starly’s name at the beginning of the author list indicates primary authorship of the research work. It is his policy to place the student’s name as the primary author of any work in Dr. Starly’s laboratory. Students/Post-Docs are in italics. Impact factors (IF) are reported for the year in which the publication appears.*

1. Aman Kumar, **Binil Starly**, "'FabNER": Information Extraction from Manufacturing Process Science Domain Literature Using Named Entity Recognition', Journal of Intelligent Manufacturing, Accepted, 2021 (IF: 6.485)

2. D. Pahwa, **B. Starly**, “Dynamic Matching with Deep Reinforcement Learning for a Two-Sided Manufacturing-as-a-Service (MaaS) Marketplace”, *SME Manufacturing Letters*, Vol 29, Pg11-14, 2021.
3. J. Zhang, Y. Zeng, **B Starly**, “Recurrent neural networks with long term temporal dependencies in machine tool wear diagnosis and prognosis”, *SpringerNature(SN) Applied Sciences 3 (4)*, 1-13, 2021.
4. Atin Angrish, A. Bharadwaj, **Binil Starly**, “MVCNN++: CAD Model Shape Classification and Retrieval using Multi-View Convolutional Neural Networks”, *ASME J. Comput. Inf. Sci. Eng. (JCISE)*, Feb 2021, 21(1): 011001 [IF 1.71]
5. Nabeel Mehdi, **Binil Starly**, “Witness Box Protocol: Automatic Machine Identification and Authentication in Industry 4.0”, *Computers in Industry*, Vol 123, 2020. [IF: 3.9]
6. **Binil Starly**, Paul Cohen, Shivakumar Raman, “Automating the Search and Discovery of Manufacturing Service Providers to enable a Digital Supply Chain Network”, *ASTM Smart and Sustainable Manufacturing Systems*, Vol 4(3), 2020.
7. Mahmud Hasan, **Binil Starly**, “Decentralized Cloud Manufacturing-as-a-Service (CMaaS) Platform Architecture with Configurable Digital Assets”, *Journal of Manufacturing Systems*, 2020, Vol 56. Pg. 157-174 [IF 3.6]
8. Sun, Wei; **Starly, Binil**; Daly, Andrew; Groll, Juergen; Cho, Dong-Woo; Takeuchi, Shoji; Burdick, Jason; Nie, Minghao; Khademhosseini, Ali; Ostrovidov, Serge; Kamm, Roger; Shu, Wenmiao; Mironov, Vladimir; Sakai, Yasuyuki; Shinohara, Marie; Nishikawa, Masaki; Ozbolat, Ibrahim; Skeldon, Gregor ; Jang, Jinah; Moroni, Lorenzo, “The bioprinting roadmap”, *Biofabrication*, 12 (2), 022002, 2020 [IF 7.3]
9. Deepak Pahwa, **Binil Starly**, “Network Based Pricing for 3D Printing Services in Two-Sided Manufacturing-as-a-Service Marketplace”, *Rapid Prototyping Journal*, 26/1 (2020) 82–88. <https://doi.org/10.1108/RPJ-01-2019-0018> [IF 2.8]
10. Atin Angrish, Benjamin Craver, **Binil Starly**, “FabSearch”: A 3D CAD Model Based Search Engine for Sourcing Manufacturing Services, *J. Comput. Inf. Sci. Eng.* 2019;19(4):041006-041006-10 [IF 1.58]
11. L.K. Narayanan, T. L. Thompson, R.A. Shirwaiker, **B. Starly**, "Label Free Process Monitoring of 3D Bioprinted Engineered Constructs via Dielectric Impedance Spectroscopy, *Biofabrication*, 2018. Jun 28;10(3):035012 [IF 6.83]
12. Deepak Pahwa, Paul Cohen, **Binil Starly**, “Reverse Auction Mechanism Reverse Auction Mechanism Design for the Acquisition of Prototyping Services in a Manufacturing-as-a-Service Marketplace, *Journal of Manufacturing Systems*, 2018, Volume 48, Part C, July 2018, Pages 134-143. [IF 2.77]
13. Patrick W. Sweeney, **Binil Starly**, Yiming Xu, Aimee Jones, Sridhar Radhakrishnan, Charles C. Davis, “Large-scale digitization of herbarium specimens: development and usage of an automated, high-throughput conveyor system”, *Taxon.*, 2018, Vol 67(1).pp 165-178 [IF 2.45]
14. Atin Angrish, **Binil Starly**, Yuan-Shin Lee, Paul Cohen, “A Flexible Data Schema and System Architecture for the Virtualization of Manufacturing Machines (VMM), *Journal of Manufacturing Systems*, 2017, 45:236-247 [IF 2.77]
15. Jianlei Zhang, Binil Starly, Yi Cai, Paul H. Cohen, Yuan-Shin Lee, "Particle Learning in Online Tool Wear Diagnosis and Prognosis", *Journal of Manufacturing Processes*, 2017, Vol 28 (3); 457-463 [IF 1.77]
16. R. Nordberg, J. Zhang, M. Frank, E. Griffith, E. Loba, B. Starly, “Electrical Cell-Substrate Impedance Spectroscopy Can Monitor Age-grouped hASC Variability During Osteogenic Differentiation”, *Stem Cells Translational Medicine*, Vol 6(2), 2017 [IF 5.0].
17. Yasar, O. and **Starly, B.**, ‘Fabrication of Lindenmayer System-Based Designed Engineered Scaffolds Using UV-Maskless Photolithography’, *MRS Advances*, 2016, 1(11), pp. 749–754.
18. L. K. Narayanan, P. Huebner, M.B. Fisher, J.T. Spang, **B. Starly**, R.A. Shirwaiker, “3D-Bioprinting of Polylactic Acid (PLA) Nanofiber-Alginate Bioink with Human Adipose-Derived Mesenchymal Stem Cells for Fibrous Musculoskeletal Tissue Engineering Applications”, *ACS Biomaterials Science and Engineering*, Vol 2(10), Pg. 1732-42 2016.[IF 3.23]

19. Arun Kumar, **Binil Starly**, “Large Scale Industrialized Cell Expansion: Producing the Critical Raw Material for Biofabrication Processes”, *Biofabrication*, 2015, Vol 7, 044103. [IF:4.7]
20. Rachel Dreher, **Binil Starly**, “Biofabrication of Multi-material 3D Constructs Embedded with Patterned Alginate Strands Encapsulated with PC12 Neural Cell Lines”, *ASME Journal of Nanotechnology in Engineering and Medicine*, May 2015, Vol. 6(2)/0210003. [IF:0.79]
21. Arun Kumar, Lokesh Narayan, Zhuo Tan, Susan Bernacki, **Binil Starly**, Rohan Shirwaiker, “Alginate Micro-Spheroid Encapsulation and Delivery of MG-63 Cells into PCL Scaffolds: A New Biofabrication Approach for Tissue Engineering Constructs”, *ASME Journal of Nanotechnology in Engineering and Medicine*, May 2015, Vol. 6(2)/0210006. [IF:0.79]
22. J. Hunsberger, O. Harrysson, R. Shirwaiker, **B. Starly**, R. Wysk, P. Cohen, J. Allickson, J. Yoo, A. Atala, “Manufacturing Roadmap for Tissue Engineering and Regenerative Medicine Technologies”, *Stem Cells Translational Medicine*, 2015 Feb;4(2):130-5. [IF:5.0]
23. M. Khandeker, M. Vaughan, **B. Starly**, “The Influence of MgO Nanoparticles on the Osseointegration of Polycaprolactone - Sodium Alginate Hydrogel Interfaces”, *British Journal of Applied Science & Technology*, 4(1): 79-88, 2014. [IF 0.19]
24. Lan, S.F., Kehinde T., Zhang X., Schmidtke, D., Khajotia, Sharukh, **Starly, B.**, “Controlled Release of Metronidazole from Composite Poly-ε-Caprolactone/Alginate Rings for Dental Implants”, *Dental Materials*. 2013 Jun; 29(6):656-65. [IF:4.4]
25. Davies, K., **Starly, B.**, “Virtual and Real: Using 3D Scanning, Modeling and Printing in Reconstructing a Juvenile Apatosaurus Skeleton”, *Journal of Vertebrate Paleontology*, 31(2), 2011. [IF:2.37]
26. Lan, S.F., **Starly, B.**, “Alginate based 3D Hydrogels as an In Vitro Co-Culture Model Platform for the Toxicity Screening of New Chemical Entities”, *Toxicology and Applied Pharmacology*, 256 (2011), Pages 62–72. [IF:4.07]
27. Parthasarathy J., **Starly, B.**, Raman S., “A design for the additive manufacture of functionally graded porous structures with tailored mechanical properties for biomedical applications”, *Journal of Manufacturing Processes*, Volume 13, Issue 2, 2011, Pages 160-170. [IF:1.77]
28. Padmanabhan, T., Kamaraj V., Magwood, L., **Starly, B.**, “Experimental Investigation on the Operating Variables of a Near-Field Electrospinning Process via Response Surface Methodology”, *Journal of Manufacturing Processes*, Vol. 13(2), pp. 104-112, 2011. [IF:1.77]
29. Ryan Charles, Shivakumar Raman, **Binil Starly**, “Sustainment: A Growth Industry for Custom Manufacturing in the United States”, *Journal of Aviation and Aerospace Perspectives*, Vol. 1, No. 1: 2011, Pg. 5–16.
30. Shih Feng Lan, Barbara Mroczka, **Binil Starly**, “Long-term cultivation of HepG2 Liver Cells Encapsulated in Alginate Hydrogels: A Study of Cell Viability, Morphology and Drug Metabolism”, *Toxicology In Vitro*, Volume 24, Issue 4, June 2010, 1314-1323. [IF:3.069]
31. Parthasarathy J., Raman S., Christensen A. **Starly, B.**, "Mechanical Evaluation of Porous Titanium (Ti6Al4V) structures with Electron Beam Melting (EBM)", *Journal of Mechanical Behavior of Biomedical Materials*, Volume 3, Issue 3, April 2010, 249-259. [IF:3.47]
32. Ozlem Yasar, Shih-Feng Lan, **Binil Starly** “A Lindenmayer systems based approach for the design of nutrient delivery networks in tissue constructs”, *Biofabrication*, Vol. 1, Issue 4, 2009. [IF:4.7]
33. Parthasarathy, J., Raman, S., **Starly, B.**, “Computer Aided Bio-modeling and Analysis of Patient Specific Porous Titanium Mandibular Implants”, *ASME Journal of Medical Devices*, Volume 3, Issue 3, 2009, 031007 [IF:0.6]
34. A. Choubey, **B. Starly**, "Real Time In-Vitro Measurement of Oxygen Uptake Rates for HEPG2 Liver Cells Encapsulated in Alginate Matrices", *J. of Microfluidics and Nanofluidics*, Volume 6, Issue 3, 2009, Page 373. [IF:2.7]

35. **Starly, B.**, Choubey, A., “Enabling Sensor Technologies for the Quantitative Evaluation of Engineered Tissue”, *Annals of Biomedical Engineering*, Vol. 36(1), pp 30-40, 2008. [IF:3.1]
36. **Starly, B.**, Sun, W., “Internal Scaffold Architecture Designs using Lindenmayer Systems”, *J. of Computer Aided Design and Applications*, Vol. 4, 395-403, 2007. [IF:0.90]
37. **Starly B.**, Yildirim E., Sun W., "A Tracer Metric Numerical Model for Predicting Tortuosity Factors in 3D Porous Tissue Scaffolds", *Journal of Computer Methods and Programs in Biomedicine*, 87, 21-27, 2007. [IF:1.86]
38. Nam, J, **Starly, B.**, Sun, W., “Computer-Aided Tissue Engineering”, *J. of Biochemistry*, 29(1):20-23, 2007. [IF:2.58]
39. Evans, P., **Starly, B.** and Sun, W., “Computer-Aided Tissue Engineering for Design and Evaluation of Lumbar-Spine Arthroplasty”, *J. of Computer-Aided Design and Application*, Vol. 3(6), pp. 771-778, 2006. [IF:0.47]
40. J.H. Piatt, **B. Starly**, E. Faerber, W. Sun, “Application of computer-assisted design in craniofacial reconstructive surgery using a commercial image guidance system”, *J. of Neurosurgery*, 2006 Jan; 104(1 Suppl.):64-7. [IF 3.74]
41. **Starly B.**, Lau W., Bradbury, T., Sun W., “Internal architecture design methodology for tissue replacement structures”, *Computer Aided Design*, Vol. 38 (2), 2006, Pages 115-124. [IF:1.957]
42. Fang, Z., **Starly, B.**, Sun, W., Shokufandeh, A., Regli, W., “A Computer Aided Multi-Scale Modeling for Direct Fabrication of Bone Tissue Structures”, *Computer-Aided Design and Applications*, Vol. 2, No 5, 2005. [IF:0.47]
43. Sun, W., **Starly, B.**, Nam, J. and Darling, A., “Bio-CAD Modeling and Its Applications in Computer-Aided Tissue Engineering”, *Computer-Aided Design*, Vol. 37 (11), 2005, 1097-1114. [IF:1.957]
44. **Starly, B.**, Lau, A., Sun, W. Lau, W. and Bradbury T., “Direct Slicing of STEP Based NURBS Models for Layered Manufacturing,” *Computer-Aided Design*, Vol. 37, Issue 4, 2005, pp 387-397. [IF:1.957]
45. Wettergreen MA, Bucklen B.S., **Starly, B.**, Yuksel E., Sun W and Liebschner MAK, “Creation of a Unit Block Library of Architectures for Use in Assembled Scaffold Engineering”, *Computer-Aided Design*, Vol. 37 (11), 2005, 1141-1149. [IF:1.957]
46. Fang, Z., **Starly, B.** and Sun, W., “Computer-Aided Characterization of Effective Mechanical Properties for Porous Tissue Scaffolds,” *Computer-Aided Design*, Vol. 37, No. 1, 2005, pp. 65-72. [IF:1.957]
47. Sun, W., Darling, A., **Starly, B.**, Nam, J., “Computer-Aided Tissue Engineering: Overview, scope and challenges”, *Biotechnology and Applied Biochemistry*, Vol. 39, Issue 1, 2004, pp. 29-47. [IF:1.429]
48. Nam, J., **Starly, B.**, Darling, A. and Sun, W., “Computer Aided Tissue Engineering for Modeling and Design of Novel Tissue Scaffolds” *J. of Computer-Aided Design and Application*, Vol. 1, No. 1-4, 2004, pp. 633-640. [IF:0.47]
49. Sun, W., **Starly, B.**, Darling, A., Gomez, C., “Computer-Aided Tissue Engineering: Application to biomimetic modeling and design of tissue scaffolds”, *Biotechnology and Applied Biochemistry*, Vol. 39, Issue 1, 2004, pp. 49-58. [IF:1.429]

CONFERENCE PROCEEDINGS

1. Y. Li, P. Cohen, S. Raman, **B. Starly**, “Design of a Knowledge Graph of a Manufacturing Services Discovery”, ASME MSEC Conference Proceedings, Cincinnati, OH, 2021
2. *Mahmud Hasan*, Kemafor Anyanwu and **Binil Starly** “Hybrid Blockchain Architecture for Cloud Manufacturing-as-a-service (CMaaS) Platforms with Improved Data Storage and Transaction Efficiency”, North American Manufacturing Research Conference 49, 2021, Cincinnati, OH.
3. *Shohanuzzaman Shohan*, *Jordan Harm*, *Mahmud Hasan*, **Binil Starly** and Rohan Shirwaiker, “Non-destructive quality monitoring of 3D printed tissue scaffolds via dielectric impedance spectroscopy and supervised machine learning”, North American Manufacturing Research Conference 49, 2021, Cincinnati, OH.
4. *H Latif*, G Shao, **B Starly**, “A Case Study of Digital Twin For a Manufacturing Process Involving Human Interactions”, Proceedings of 2020 Winter Simulation Conference, Orlando, FL

5. *H. Latif, **B. Starly***, "A Simulation Algorithm of a Digital Twin for Manual Assembly Process", 2019 *Procedia Manufacturing* 48, 932-939.
6. *Nabeel S. Mehdi, **Binil Starly***, "A Simulator for MT-Connect Based Machines in a Scalable and Federated Multi-Enterprise Environment", *Proceedings of the 2019 Winter Simulation Conference* N. Mustafee, K.-H.G. Bae, S. Lazarova-Molnar, M. Rabe, C. Szabo, P. Haas, and Y.-J. Son, eds.
7. *Maaz Saleem Kapadia, **Binil Starly**, Alec Thomas, Reha Uzsoy, Donald Warsing*, "Impact of Scheduling Policies on the Performance of an Additive Manufacturing Production System", 25th International Conference on Production Research Manufacturing Innovation: Cyber Physical Manufacturing, August 9-14, 2019, Chicago, Illinois (USA).
8. *H. Latif, G. Shao, **B. Starly***, "Integrating A Dynamic Simulator and Advanced Process Control Using the OPC-UA Standard", *North American Manufacturing Research Conference* 47, June 10-14th, 2019, Erie, Pennsylvania.
9. *R. Sherlekar, P. Cohen, **B. Starly***, "Provisioned Data Distribution for Intelligent Manufacturing via Fog Computing", *North American Manufacturing Research Conference* 47, June 10-14th, 2019, Erie, Pennsylvania.
10. *A. Angrish, B. Craver, M. Hasan, **B. Starly***, "A Case Study for Blockchain in Manufacturing: "FabRec": A Prototype for Peer-to-Peer Network of Manufacturing Nodes", *North American Manufacturing Research Conference* 46, June 18-22nd, 2018, Texas A&M, College Station, Texas.
11. *A. Angrish, B. Craver, X. Xu, **B. Starly***, "A Search Engine for Manufacturers Using Product Manufacturing Information (PMI) Enhanced 3D Model Search", 2018 ASME International Manufacturing Science and Engineering Conference (MSEC), June 18-22, 2018, Texas A&M, College Station, Texas.
12. *Deepak Pahwa, **Binil Starly***, "A Multi Agent based Manufacturing Service Marketplace: Towards Intelligent Cloud Manufacturing Services", 2018 IISE Annual Conference, K. Barker, D. Berry, C. Rainwater, eds.
13. *Yi Cai, **Binil Starly**, Yuan-Shin Lee*, "Sensor Fusion for Digitalization of Legacy Machine Tools", *Proceedings of the 2018 IISE Annual Conference*, K. Barker, D. Berry, C. Rainwater, eds.
14. *Atin Angrish, Benjamin Craver, Mahmud Hasan, **Binil Starly***, "A Case Study for Blockchain in Manufacturing: "FabRec": A Prototype for Peer-to-Peer Network of Manufacturing Nodes", *Procedia Manufacturing* 2018.
15. *Atin Angrish, Benjamin Craver, Xiwen Xu, **Binil Starly***, "A Search Engine for Manufacturers using Product Manufacturing Information (PMI) Enhanced 3D Model Search", accepted with minor revision, 2018 ASME MSEC, College Station, Texas A&M.
16. *A. Kumar, W. Lau, **B. Starly***, "Human Mesenchymal Stem Cells Expansion on Three-Dimensional (3D) Printed Polystyrene (PS) Scaffolds in a Perfusion Bioreactor", 2017 *Procedia CIRP, Volume 65, 2017, Pages 115-120*.
17. *L. Narayan, T. Thompson, **B. Starly**, R. Shirwaiker*, "Non-destructive Real-time Quality Assessment of 3D-Biofabricated Constructs using Dielectric Impedance Spectroscopy", *Proceedings of the 2017 Industrial and Systems Engineering Research Conference (ISERC), Pittsburgh, PA. – 2017 IIE ISERC Student Best Paper Award*.
18. *Yi Cai, **Binil Starly**, Shaurabh Singh, Paul Cohen and Yuan-Shin Lee*, "Sensor Data and Information Fusion to Construct Digital-Twins Virtual Machine Tools for Cyber-Physical Manufacturing", 2017 *Procedia Manufacturing, 10, 1031 – 1042*.
19. *L. Narayan, T. Thompson, A. Bhat, **B. Starly**, R. Shirwaiker*, "Investigating Dielectric Impedance Spectroscopy As a Non-Destructive Quality Assessment Tool for 3D Cellular Constructs, 2017 ASME MSEC, Los Angeles, CA.
20. *Shaurabh Singh, Atin Angrish, **Binil Starly**, James Barkley, Yuan-Shin Lee, Paul Cohen*, "Streaming Machine Generated Data to Enable a Third-Party Ecosystem of Digital Manufacturing Apps", 2017 *Procedia Manufacturing, 10 (2017):1020 – 1030*.
21. *A. Angrish, **B. Starly**, X. Shen, Y.S. Lee, P. Cohen*, "Scalable Linking of Slice Layer Information with Process Monitoring Data – A Case Study with Additive Manufacturing Machines", 2016 *Solid Freeform Fabrication Symposium, Austin, TX*.

22. Lakshman N.C. Annadorai, Atin Angrish, Xipeng Shen, **Binil Starly**, Yuan-Shin Lee and Paul Cohen, “Opportunities for JIT in Advancing Intelligent Manufacturing”, *2016 Proceedings in Languages and Compilers in Parallel Computing, Rochester, NY.*
23. Kumar, A., **Starly, B.**, “Modeling Human Mesenchymal Stem Cell Expansion in Vertical Wheel Bioreactors using Lactate Production Rate in Regenerative Medicine Biomanufacturing”, *2016 ASME MSEC Proceedings, Virginia-Tech, Blacksburg, VA.*
24. Nordberg, RC, Frank, MW, Zhang, J., **Starly, B.**, Loba, EG, "Age-dependent Regulation of hASC Osteogenesis Quantified via Electrical Cell-substrate Impedance Spectroscopy", *2015 Tissue Engineering Part A, Volume: 21, Pages: S225-S226 Supplement: 1.*
25. Melvin R. Millberg, Arun Kumar, **Binil Starly**, "A Parametric Study on Alginate Hydrogel based Microbead Formation using Electrostatic Field Driven Droplet Generation", *Proceedings of the 2015 Industrial and Systems Engineering Research Conference, Nashville, TN.*
26. Ambati S., Raman, S., **Starly, B.**, “Quantitative Study on Image Based Material Identification Using Micro-Computed Tomography”, *Proceedings of NAMRI/SME, Vol 41, 2013.*
27. Rachel Dreher, Ryan Power, **Binil Starly**, "Biofabrication of Multi-Material Constructs Embedded with Patterned PC12 Neural Cell Lines”, *Proceedings of the ASME Bioengineering Conference, June 25-29th, 2013, OR, USA.*
28. **Binil Starly**, Shih-Feng Lan, David Schmidtke, “Customized Release of Metronidazole from Composite Casted Rings of Poly-Caprolactone/Alginate for Periodontal Drug Delivery”, *Proceedings of the ASME Bioengineering Conference, June 25-29th, 2013, OR, USA.*
29. Dilley, A., Krause E., Huang S., Raman, S., **Starly, B.**, “Virtual Reconstruction and Rapid Prototyping of a Juvenile Apatosaurus”, *SME RAPID Conference Proceedings, May 24-26th, Minneapolis, MN, 2011.*
30. L. Magwood, **B. Starly**, “Fabrication of Low Cost 1D CdSe Nanowires using Near-field Electrospinning”, *2010 Fall Meeting, MRS Proceedings, 2011 1302: mrsf10-1302-w09-14 (6 pages)*
31. A. Dilley, A. Carlile, C. Pascual, L. Friend, J. Ferguson, **B. Starly**, S. Raman, “Rapid Prototyping of a Juvenile Apatosaurus from 3D Scans”, *ASME 2010 International Manufacturing Science and Engineering Conference, Oct 12-15th 2010, Erie, PA.*
32. Lan S.F, **Starly, B.**, “Cell Functionality and Metabolic Stability in Perfusion Flow based In-Vitro Liver Tissue Systems”, *2010 First International Conference on Biofabrication, Philadelphia, PA.*
33. S. Bouamor, C. Ling, **B. Starly**, R. Shehab, “Multimodal Learning Interfaces: Assessing the Effectiveness of Haptic and Visual Interfaces on Student Learning of Statics”, *2010 IIE Annual Conference & Exposition, 15.897.1-15.897.9.*
34. Ozlem Yasar, Shih-Feng Lan, **Binil Starly**, “Dependence of Lindenmayer System (L-system) Parameters on Flow Characteristics in Engineered Biomaterials”, *2009 ASME World Congress, Nov 2009, FL, USA.*
35. Jayanthi Parthasarathy, **Binil Starly**, Shivakumar Raman, “Design of Patient Specific Porous Titanium Implants for Craniofacial Applications”, *RAPID 2008 Conference & Exposition Proceedings, May 2008, FL, USA – 2008 SME Dick Aubin Distinguished Paper award. <https://www.sme.org/aboutsme/awards/dick-aubin-distinguished-paper-award/dick-aubin-distinguished-paper-award-recipients/>*
36. Yasar O., Dinh M., Lan Shih-Feng, **Starly B.**, "Fabrication of micropatterned hydrogels using maskless photopolymerization for tissue engineering applications", *Proceedings of the ASME Bioengineering Conference, June 25-29th, 2008, Florida, USA.*
37. Ribeiro A., Maia F., Yasar O., **Starly B.**, Leach J., "Selectively Degradable Hydrogels for Investigating Cell-Cell Interactions in Co-culture", *Society for Biomaterials Symposium, September 11th-13th, 2008, Atlanta, Georgia, USA.*
38. Yasar O., Martin M., Harris C., Sun S., **Starly B.**, “Layered Fabrication of Branched Networks using Lindenmayer Systems”, *Proceedings of 18th Solid Freeform Fabrication Symposium, August 6-8th, 2007, Austin, TX, USA.*

39. Starly, B., Chang, R., Sun, W., "Fabrication of Hepatocyte Encapsulated Poly-Ethylene Glycol Hydrogels using UV-Photolithography", *Proceedings of 17th Solid Freeform Fabrication Symposium, August 14-16th, 2006, Austin, TX, USA.*
40. Chang, R., Starly, B., Sun, W., "Integration of Liver Encapsulated Alginate Hydrogels onto a Microfluidic Platform Using Freeform Fabrication", *Proceedings of 17th Solid Freeform Fabrication Symposium, August 14-16th, 2006, Austin, TX, USA.*
41. Gomez, C., Starly B., Shokoufandeh, A., Sun, W., "Transferring optimized unit cell based tissue scaffold designs to a freeform fabrication system", *Proceedings of the 17th Solid Freeform Fabrication Symposium, Austin, TX, August 14-16, 2006.*
42. Starly, B., Chang, R., Sun, W., Culbertson, C., Holtorf, H. and Gonda, S., "Bioprinted Tissue-on-chip Application for Pharmacokinetic Studies", *World Congress on Tissue Engineering and Regenerative Medicine, Pittsburgh, PA, USA, April 24-27, 2006.*
43. Robert C Chang, Binil Starly, Christopher Culbertson, Heidi Holtorf, Steve Gonda and Wei Sun, "Development of an *in vitro* Micro-organ Model for Pharmacokinetic Microanalysis", *Proceedings of 2006 IEEE Northeast Bioengineering Conference, Lafayette College, Easton, PA, April 1-2, 2006.*
44. B. Starly, L. Shor, S. Guceri and W. Sun, "Space Filling Curves: Its Design and Fabrication for Extrusion Based SFF Systems", *Proceedings of IMECE2005, 2005 ASME International Mechanical Engineering Congress and Exposition, November 5-11, 2005, Orlando, Florida USA.*
45. Wettergreen M., Bucklen B., Starly B., Yuksel E., Sun W., Liebschner M., "Unit Block Library of Basic Architectures for Use in Computer-Aided Tissue Engineering of Bone Replacement Scaffolds." *Advances in Bio-Manufacturing, ASME IMECE 2005, Orlando, FL, November 5-11, 2005.*
46. P. Evans, B. Starly and W. Sun, "Computer Aided Tissue Engineering Design for a Spinal Intervertebral Disc", *2005 IEEE Northeastern Bioengineering Conference, Stevens Institute of Technology, April 2 – 3, 2005., New Jersey, USA.*
47. B. Starly, L. Shor, Z. Fang and W. Sun, "Design and Freeform Fabrication of Load Bearing Tissue Scaffolds", *2005 IEEE Northeastern Bioengineering Conference, Stevens Institute of Technology, April 2 – 3, 2005., New Jersey, USA.*
48. L. Shor, A. Darling, B. Starly, W. Sun and S. Guceri, "Precision Extruding Deposition of Composite Polycaprolactone/Hydroxyapatite Scaffolds for Bone Tissue Engineering", *2005 IEEE Northeastern Bioengineering Conference, Stevens Institute of Technology, April 2 – 3, 2005., New Jersey, USA.*
49. J.H. Piatt, B. Starly, E. Faerber, W. Sun, "Image Guided Craniofacial Reconstructive Surgery", *Advanced Digital Technology in Head and Neck Reconstruction, March 10-13, 2005, Edmonton, Alberta, Canada.*
50. B. Starly, Z. Fang, S. Khalil, L. Shor, W. Sun, "Biomimetic Design and Fabrication of Tissue scaffolds", the 2nd International Workshop on Bioprinting, Biopatterning and Bioassembly", *March 14-15, 2005, Medical University of South Carolina, Charleston, SC, USA.*
51. B. Starly, W. Sun, A. Lau, W. Lau, T. Bradbury, "Biomimetic Design and Fabrication of Tissue scaffolds", *Proceedings of the 2004 Biomedical Engineering Society Annual Fall Meeting, October 13-16, 2004, Pennsylvania Convention Center, Philadelphia, PA, USA.*
52. B. Starly, W. Sun, A. Lau, W. Lau, T. Bradbury, "Biomimetic Design and Fabrication of Interior Architecture of Tissue scaffolds using Solid Freeform Fabrication," *Proceedings of 15th Solid Freeform Fabrication Symposium, August 3-5, 2004, Austin, TX, USA.*
53. B. Starly, A. Darling, C. Gomez, W. Sun, A. Shokoufandeh, W. Regli, "Image Based Bio-CAD Modeling and Its Application in Biomedical and Tissue Engineering", *ACM Symposium on Solid Modeling and Applications 04, Genova, Italy, June 9-11, 2004.*

54. B. Starly, C. Gomez and W. Sun, “Biomimetic Modeling and Design of 3D Bone Scaffolds”, *Proceedings of the 6th International Conference on Tissue Engineering, Dec. 10-13, 2003, Orlando, FL, USA.*
55. Starly, A. Lau, W. Sun, W. Lau, T. Bradbury, A. Youssef, C. Gaylo, “Direct Slicing of STEP Based NURBS Models for Solid Freeform Fabrication,” *Proceedings of 14th Solid Freeform Fabrication Symposium, August 4-6, 2003, Austin, TX, USA.*
56. Wang, L. Shor, B. Starly, A. Darling, S. Güçeri, W. Sun, “Fabrication of Cellular Poly-ε-Caprolactone (PCL) Scaffolds by Precision Extruding Deposition Process,” *Proceeding of 29th Northeastern Bioengineering Conference, March 23-24, 2003, NJIT, Newark, NJ, USA.*
57. Starly, C. Gomez, A. Darling, Z. Fang, A. Lau, W. Sun, W. Lau, T. Bradbury, A. Youssef, C. Gaylo, “Computer-Aided Bone Scaffold Design – A Biomimetic Approach,” *Proceeding of 29th Northeastern Bioengineering Conference, March 23-24, NJIT, 2003, Newark, U.S.A.*
58. Darling, B. Starly, C. Gomez, Z. Fang and W. Sun, “Image-based biomimetic modeling and its application in computer-aided tissue engineering”, *SPIE/BIOS 2003 – Symposium on optical technologies to solve problems in tissue engineering and tissue mechanics, Jan. 25-31, 2003, San Jose, CA, USA.*

RESEARCH PRESENTATIONS

Invited presentations:

1. “AI in Product Design and Manufacturing”, Invited Virtual Speaker, **International Conference on Advanced Materials and Mechanical Characterization**, Dec 2-4th 2021, India (Virtual).
2. “Git and GitHub Collaboration Tool for Manufacturing Engineers”, **SME Virtual Seminar Series**, Mar 30th 2021.
3. “Building a Knowledge Graph in Design and Manufacturing”, Invited Virtual Department Seminar, **University of Tennessee, Knoxville**, Industrial and Systems Engineering, Feb 13th, 2021.
4. “Decentralized Manufacturing Systems”, Invited Virtual Department Seminar, **University of Arizona**, Systems and Industrial Engineering, Dec 3rd, 2020.
5. “Building a Knowledge Graph in Design and Manufacturing”, Invited Virtual Department Seminar, **University of Central Florida**, Mechanical and Aerospace Engineering, Oct 30th, 2020.
6. “AI in Product Design Search and in Manufacturing”, Invited Virtual Talk, **Autodesk AI R&D Group**, Oct 28th, 2020.
7. “Design and Manufacturing Knowledge Graph”, Invited Virtual Talk, **Ontology Summit**, April 8th 2020.
8. “AI in Manufacturing”, Invited Virtual Talk, **AAAI Data in Manufacturing Symposium**, Stanford, CA Mar 25-27th 2020.
9. “Building the Open Knowledge Network Graph with Product Design and Manufacturing Data”, Invited Talk, Saint Gobain R&D Group, Boston, MA, Feb 28th 2020.
10. “Building the Open Knowledge Network Graph with Product Design and Manufacturing Data”, **Keynote Talk, 3rd US Semantic Technology Symposium**, Raleigh, NC., Mar 9-10th 2020
11. “Manufacturing Knowledge Network”, Invited Talk, **NIST Smart Manufacturing Group**, Gaithersburg, MD, Feb 6th 2020
12. “Democratizing Manufacturing via Geometric Deep Learning, Blockchain and Manufacturing-as-a-Service (MaaS) Platform”, **ASME IDETC-CIE Panel Invited Talk** at Computer Aided Product and Process Design Panel, Anaheim, CA 2019, Aug 18th 2019.
13. “The Age of Intelligent Machines: Bioreactors – Biofabrication - Blockchain”, Invited Seminar Speaker, **University of New Hampshire**, Department of Mechanical Engineering, April 23rd 2019.

14. “Manufacturing-as-a-Service platforms”, Invited Talk, **TechTextil North America, Raleigh, USA** Feb 28th 2019.
15. “Decentralized Manufacturing Marketplaces via Blockchain”, Invited Talk, **HOUSTEX, Houston TX** Feb 26th-27th 2019.
16. “Digital Twin Technology in Manufacturing”, **NSF CPI PI Invited Talk**, Washington DC, Nov 16th 2018.
17. “Decentralized Manufacturing-as-a-Service Marketplace”, **Invited Plenary Talk, Solid Freeform Fabrication**, Austin, TX, Aug 13-15th 2018.
18. “Composable Manufacturing Services Through Decentralization”, Invited Talk **NIST**, Gaithersburg, MD. April 23rd – 24th, 2018
19. “Distributed Intelligence in Manufacturing”, Invited Panelist, 2018 **NIST MBE Summit**, Gaithersburg, MD, April 4-5th 2018.
20. “Transitioning from Ph.D. to a Building an Independent Research Program”, **Building Future Faculty Program**, NC State University, Raleigh NC, March 16th 2018.
21. “Three B’s of Regenerative Medicine – Bioreactors, Biofabrication and Blockchain”, Invited Speaker, **USF Medical Engineering/Industrial Engineering** Speaker, Tampa, Florida, Feb 9th 2018.
22. “Expansion of Human Mesenchymal Stem Cells (hMSCs) using 3D Printed Scaffolds in Tube-Free Closed Perfusion Bioreactors”, *Keynote speaker*, **International Conference on Biofabrication**, Oct 15th – 18th, 2017, Beijing, China.
23. “Manufacturing Machine Data Analytics – use cases within the Digital Manufacturing Commons”, **ARC Forum Panel Speaker**, Orlando, Florida, Feb 16th, 2017.
24. “Data-As-A-Service: Enabling Supply Chain Visibility”, **Defense Manufacturing Conference**, Denver, Colorado, Nov 30th, 2016.
25. “Digital Manufacturing Commons – A Platform for Manufacturing Apps”, **Digital Manufacturing Design Institute Members Meeting**, Chicago, IL, Nov 17th, 2016.
26. “Creating a Curriculum around Smart Manufacturing”, **Panel Speaker hosted by Smart Manufacturing Leadership Council, Corning Inc.**, Painted Post, NY, July 12th 2016.
27. “Scale-Up of Manufacturing in Dental Regenerative Medicine”, **Penn Multidisciplinary Consortium Research Symposium**, University of Pennsylvania Dental School, Philadelphia, PA, Mar 12th 2016.
28. “Manufacturing in Regenerative Medicine”, **NC Tissue Engineering and Regenerative Medicine Society (NCTERMS)**, Winston Salem, Oct 16th 2015.
29. “Regenerative Medicine Manufacturing”, **Beth and Kimbler Seminar Series, Department of Industrial and Systems Engineering**, University of South Florida, Jan 29th 2015.
30. “Measuring Dielectric Properties of Stem Cells via Electrical Impedance Spectroscopy”, **Scale up and Manufacturing of Cell-Based Therapies IV**, Jan 18-22nd, 2015, San Diego, CA.
31. “3D Bioprinting”, **RTP 180**, Jan 15th 2014, Research Triangle Park, Durham, NC
32. “Medical Applications of 3D Printing”, Nov 25th 2014, **Sanford Rotary Club**, Sanford, NC.
33. “3D Printing in Regenerative Medicine and Drug Screening”, **D2D: Data to Drugs & Diagnostics**, June 11-12, 2014 at the NJ Exposition Center in Edison, NJ.
34. “Manufacturing for Regenerative Medicine”, **UNC/NCSU Sponsored Symposium on Regenerative Medicine**, Oct 2013.
35. “3D Scanner Technology for Paleo Digitization”, **Paleontology Digitization Workshop: Vertebrates, Invertebrates, Plants, Yale Peabody Museum New Haven, CT**, September 23–26, 2013,

36. “Build up towards a decade of Engineered Tissue Manufacturing”, Feb 13th, 2013, **Industrial & Systems Engineering, North Carolina State University**, Raleigh, NC.
37. “Engineering Living Tissue Systems”, June 18th, 2012, **Department of Mechanical Engineering, Stevens Institute of Technology**, Hoboken, NJ.
38. “3D Patterned Hydrogels for Drug Toxicity Screening Platforms”, **2012 International Conference on Early Toxicity Screening**, June 14-15th 2012, Seattle, Washington.
39. “Perspectives on Biofabrication of Engineered Tissue Substitutes”, **University of Texas, San Antonio**, Department of Biomedical Engineering, Jan 12th 2011.
40. “Laser Scanning of Museum Collection Specimens”, **Sam Noble Museum of Natural History**, University of Oklahoma, Dec 3rd, 2009.
41. “A Drug Screening Tissue-on-Chip Screening System”, **Tsinghua University, China**, Department of Mechanical Engineering, May 10th, 2009.
42. “Engineering Living Tissue Substitutes”, **Oklahoma State University, Department of Industrial Engineering**, April 3rd, 2009.
43. “A Drug Screening Tissue-on-Chip Screening System”, **University of Central Oklahoma, Department of Physics and Engineering**, February 19th, 2009.
44. “Engineering Living Tissue Substitutes: A Design and Manufacturing Perspective”, **University of Southern California**, Los Angeles, Department of Industrial and Systems Engineering, September 27th, 2007.
45. “Computer Aided Tissue Engineering”, **MIMICS User group meeting**, Washington DC, June 1st, 2007.
46. “Engineering Living Tissue Systems”, **Oklahoma School of Science and Mathematics (OSSM)**, Nov 8th, 2006.
47. “Design and Biofabrication of Tissue Engineered Substitutes using Computer Aided Tissue Engineering”, **School of Industrial Engineering, University of Oklahoma**, School of Industrial Engineering, March 1st, 2006.
48. “Image Based CAD Modeling in Product Design”, **Grand Valley State University**, Department of Mechanical Engineering, February 2nd, 2006.
49. “Biomimetic Design and Fabrication of Tissue Scaffold Structures”, **2nd International Workshop on Bioprinting, Medical University of South Carolina**, 13th March 2005.

FUNDED PROPOSALS

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|----|---|------------------------|
| 25 | Large Scale Text Analysis of Manufacturing Literature
Sponsor: Saint Gobain R&D, North America
PI: Binil Starly
Location: NC State, Raleigh, NC | 2021 - 2022
74,200 |
| 24 | Digital Fingerprinting of Manufacturing Machines
Sponsor: CISCO R&D
PI: Binil Starly (CoPI, Xiaolei Fang)
Location: NC State, Raleigh, NC | 2021 - 2022
174,000 |
| 23 | RAPID: Supply Chain in US Manufacturing in a COVID-19 Crisis
Agency: University of Maryland (National Science Foundation)
PI: Binil Starly (UMD PI: Louiqa Raschid, USC PI: Jay Pujara, OU PI: Shivakumar Raman)
Location: NC State, Raleigh, NC | 2020- 2021
\$10,000 |

22	C-Accel Phase-I: Product Design and Manufacturing Graph as a Service Agency: National Science Foundation PI: Binil Starly (NYU PI: Daniele Panozzo, OU PI: Shivakumar Raman) Location: NC State, Raleigh, NC	2020- 2021 \$900,000
21	SBIR Phase I: Enhanced Cybersecurity for Manufacturing Agency: Department of Energy (Secmation Inc.) PI: Binil Starly (CoPI – Rusty King, Ola Harrysson) Location: NC State, Raleigh, NC	2019 - 2020 \$60,000
20	Real-Time Dielectric Spectroscopy of Scaffolds and Tissue Constructs PI – Binil Starly (CoPI: Rohan Shirwaiker, Paul Cohen, Aditya Bhat (ABER Instruments) Agency: Advanced Regenerative Manufacturing Institute (ARMI)	2019-2020 \$250,000 NCSU Cost Match (\$250,000) \$500,000
19	Planning Grant: Engineer Research Center: “Design by Anyone Build Anywhere” Agency: National Science Foundation PI: Binil Starly, CoPI- Paul Cohen Location: NC State, Raleigh, NC	2018-2020 \$99,999
18	CSR: Medium: SmartChainDB - Enabling Smart Marketplaces With A Scalable Semantically-Enhanced Blockchain Platform Agency: National Science Foundation PI: Kemafor Ogan (CoPI: Binil Starly, Alessandra Scafuro)	2018 - 2020 \$499,999
17	CESER: Pilot Manufacturing Cyberinfrastructure for Information Rich 3D Model Data Agency: National Science Foundation PI: Binil Starly, CoPI- Yong Chen, Univ. of Southern California Location: NC State, Raleigh, NC	2018 - 2020 \$299,999
16	I-Corps: A Platform for Matching Manufacturing Service Companies with Design Enterprises Agency: National Science Foundation PI: Binil Starly, CoPI: Wade Fulghum Location: NC State, Raleigh, NC	2016 - 2017 \$50,000
15	Streaming Machine Data from a Mill-Turn to the Digital Manufacturing Commons Agency: Digital Manufacturing Design Institute (Prime-DoD) PI: Binil Starly, CoPI: Yuan-Shin Lee, Paul Cohen Location: NC State, Raleigh, NC	2016 – 2017 \$398,307 (50:50) (\$194,618)
14	Monitoring Quality of Bioprinted Constructs in Engineered Tissue Manufacturing. Agency: NSF (CMMI – Manufacturing & Machines) PI: Binil Starly (CoPI – Rohan Shirwaiker) Location: NC State, Raleigh, NC	2016-2019 \$302,083
13	Cybermanufacturing: Just-In-Time Compilation of Product Manufacturing Data to Machine Instructions via an Industrial Machine Operating System Agency: NSF (CMMI – Engineering Interdisciplinary Research) PI: Binil Starly (CoPI – Yuan-Shin Lee, Paul Cohen, Xipeng Shen)	2015-2018 \$319,752

Location: NC State, Raleigh, NC

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| 12 | Encapsulation of Pancreatic Islet Cells Spheroids
<i>Agency:</i> Comparative Medicine Institute (CMI @NCSU)
<i>CoPI:</i> Binil Starly (PI – Christopher Adin)
<i>Location:</i> NC State, Raleigh, NC | 2015-2017
\$10,000 |
| 11 | Ultra-Sound Assisted Bioprinting Development
<i>Agency:</i> Comparative Medicine Institute (CMI @NCSU)
<i>CoPI:</i> Binil Starly (PI – Rohan Shirwaiker)
<i>Location:</i> NC State, Raleigh, NC | 2016-2017
\$10,000 |
| 10 | Mobilizing New England Vascular Plant Specimen Data to Track Environmental Changes:
- High Throughput Digitization Platform of Herbarium Specimens”
<i>Agency:</i> Subcontract from Yale University (Prime – NSF, \$2.37M)
<i>PI:</i> Binil Starly (Yale University, <i>PI:</i> Patrick Sweeney)
<i>Location:</i> NC State, Raleigh, NC | 2012 – 2016
\$226,879 |
| 9 | Regenerative Medicine Approaches for the Treatment of Diabetes
<i>Agency:</i> NCSU Research and Innovation Seed Funding (RISF) Program
<i>CoPI:</i> Binil Starly (NCSU <i>PI:</i> Jorge Piedrahita)
<i>Location:</i> NC State, Raleigh, NC | 2014 – 2015
\$18,000 |
| 8 | “NSF CAREER: Bio-Manufacturing Heterogeneous Multi-scale 3D Matrices for
Engineering Living Tissue Systems”
<i>Agency:</i> NSF(CMMI-Manufacturing and Machines)
<i>PI:</i> Binil Starly
<i>Location:</i> NC State, Raleigh, NC | 2009-2015
\$400,000 |
| 7 | “MRI: Acquisition of a Fluorescence Activated Cell Sorter (FACS)”
<i>Agency:</i> NSF (MRI Program)
<i>CoPI:</i> Binil Starly (University of Oklahoma, <i>PI:</i> David Schmidtke)
<i>Location:</i> University of Oklahoma, Norman | 2012 – 2014
\$394,343 |
| 6 | Development of Adult Stem Cell Characterization Facilities”, Oklahoma Center for Adult
Stem Cell Research
<i>Agency:</i> Oklahoma Center for Advanced Science and Technology (OCAST)
<i>CoPI:</i> Binil Starly (University of Oklahoma, <i>PI:</i> David Schmidtke)
<i>Location:</i> University of Oklahoma, Norman | 2011 – 2013
\$155,497 |
| 5 | “Application of Single-Walled Carbon Nanotubes”
<i>Agency:</i> US Dept. of Energy
<i>CoPI:</i> (University of Oklahoma, <i>PI:</i> Daniel Resasco)
<i>Location:</i> University of Oklahoma, Norman | 2010 – 2013
\$972,000 |
| 4 | “Shape Engineering towards Advanced Manufacturing”,
<i>Agency:</i> Oklahoma Center for Advanced Science and Technology (OCAST)
<i>CoPI:</i> Binil Starly (University of Oklahoma, <i>PI:</i> Shivakumar Raman)
<i>Location:</i> University of Oklahoma, Norman | 2009 - 2012
\$3,000,000 |
| 3 | “Role of Design Geometry on Metabolic Clearance Rates for Liver Tissue Model Systems” | 2007 - 2010 |

- Agency: Oklahoma Center for Science and Technology (OCAST) \$127,000
 PI: Binil Starly
 Location: University of Oklahoma, Norman
- 2 "REU Site: Sensors and Metrology for Manufacturing and Newer Enterprises", 2007 - 2010
 Agency: National Science Foundation (NSF) \$300,000
 CoPI: Binil Starly (University of Oklahoma, PI: Shivakumar Raman)
 Location: University of Oklahoma, Norman
- 1 "GAANN: Promoting Versatility in Doctoral Bioengineering Education." 2008 - 2011
 Agency: US Department of Education \$511,524
 CoPI: Binil Starly (University of Oklahoma, PI: Ed O'Rear)
 Location: University of Oklahoma, Norman

PATENTS & LICENSES

- "Word Embedding Model of Manufacturing-Material Science Literature", Software License to Saint Gobain R&D, 08/09/2021
- "Manufacturing 3D Search", Software License to Fabwave Labs, LLC. 11/14/2018
- "Bioprinting 3D structures onto microscale tissue analog devices for pharmacokinetic study and other uses", US Patent# 8,343,740, Published 2nd May 2013.
- "Tubeless Bioreactors for Cell Expansion in Cell Therapy and Regenerative Medicine Manufacturing", disclosed Oct 30th, 2017, #18088
- "Method and System for Identifying, Matching and Ranking Prospective Graduate Students for University Programs", Disclosed Oct 2013 to NCSU Intellectual Property Office. #14073.

PROFESSIONAL ACTIVITIES

Professional Society Memberships

- Institute of Industrial Engineers (IIE)
- Society of Manufacturing Engineers (SME)

Professional Service

Current

- ASME – Manufacturing Science Engineering (MSEC) Technical Committee Chair, July 2022-June 2023
- ASME – Manufacturing Science Engineering (MSEC) Technical Committee Co-Chair, July 2021-June 2022
- Department Editor, IISE Transactions Design & Manufacturing Division, Aug 2018 – present
- Editorial Board Member: Journal of Biofabrication (2013-present)
- Executive Trainer, Institute of Defense and Business (IDB), Chapel Hill, NC (2015 – present)
- NSF Panel Reviewers: MRI, CMMI, CBET (2006 –present)

Past

- ASME MSEC Data Management in Factories Co-Chair, Texas A&M, TX, 2018
- NAMRC Cyber-Physical Systems Co-Chair, Texas A&M, TX, 2018
- ASME MSEC Data Management in Factories Co-Chair, University of Southern California, CA, 2017
- SME NAMRC Cyber-Physical Systems Co-Chair, University of Southern California, CA, 2017
- Session Chair of Biomedical Design and Manufacturing, ISERC 2016, Los Angeles, CA.
- 2016 FAME Award Committee Member, Solid Freeform Fabrication.

- Co-Chair to World Biomaterials Congress Symposia – ‘Biomaterials in 3D Bioprinting’, May 2016
- JDRF Reviewer
- NSF Graduate Fellowship Panel Member (2014)
- North Carolina Biotechnology Bioprocess Development Steering Committee Member (2014-2015)
- ASME MED Biomanufacturing Technical Committee Chair (2011-2013)
- ASME NAMRI/MSEC/ICMP 2011 Biomanufacturing Symposium Chair, Oregon University, June 2011.
- ASME MED Biomanufacturing Technical Committee Vice-Chair (2009-2011).
- South Carolina Economic Excellence Center Reviewer.
- Research Paper Reviewer for 17 Journals: Journals of American Institute of Chemical Engineers (AiCHE) Proceedings, PLoS ONE, Biofabrication, Biomaterials, Rapid Prototyping, ASME Nanotechnology, ASME Manufacturing Science, ASME J. of Medical Devices, Rapid Prototyping Journal, Microfluidics and Nanofluidics, Trends in Biotechnology, Journal of Biomedical Materials Research - Part A&B, Experimental Techniques, Acta Biomaterialia, IEEE Human Systems Engineering, Computer Aided Design, Journal of Membrane Science and American Society for Artificial Internal Organs (ASAIO).

Departmental, College and University Service

- 2020 – 2022 ISE Future Strategy Committee Chair
- 2020 – 2022 ISE Re-appointment Promotion Tenure (RPT) Committee Chair
- 2014 – 2020 Chair of Undergraduate Curriculum Committee (Industrial and Systems Engineering)
- 2019 – 2020 Dopaco Chair ISE Faculty Search Committee Member
- 2017 – present College of Veterinary Medicine GMP Facility Committee
- 2017 – 2019 ISE Engineering Management Committee
- 2018 – 2019 ISE Enhancement Technology Fee Administrator
- 2016 – 2018 Faculty Senate Hearing Committee
- 2016 – 2017 ISE Department Head Search Committee Member
- 2013 – 2014 Undergraduate Committee Member

PUBLIC MEDIA ON STARLY’S WORK

- “Meet the Blockchain for building better widgets, cheaper and faster”, **MIT Tech Review** Article, May 3rd 2018. <https://www.technologyreview.com/s/611074/meet-the-blockchain-for-building-better-widgets-cheaper-and-faster/>. Also appeared in IISE Magazine - Frontline, NSF News from Field, NCSU Research Office.
- Process development work featured in on-line version of **IISE journal**, “Prehistoric Reverse Engineering Brings Dinosaur Bones To Life”. <http://www.iinet2.org/details.aspx?id=20994>. This work was also featured in the Smithsonian Magazine, Oct 2011, “A Juvenile Apatosaurus Makes its Debut”, <http://www.smithsonianmag.com/science-nature/a-juvenile-apatosaurus-makes-its-debut-101379607/?no-ist>
- Research work mentioned in local TV channel – WRAL Morning News, <http://www.wral.com/wral-tv/video/13646945/>. Morning TV Host Bill Leslie talks with Binil Starly on Printed Engineered Tissue., May 15th 2014.