

**CURRICULUM VITAE**  
**Andres Tovar**

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## **EDUCATION**

- Ph.D. Aerospace and Mechanical Engineering, University of Notre Dame, Indiana, Jan 2005  
Dissertation: *Bone Remodeling as a Hybrid Cellular Automaton Optimization Process*  
Advisor: John E. Renaud
- M.S. Mechanical Engineering, University of Notre Dame, Indiana, May 2004  
Advisor: John E. Renaud
- M.S. Industrial Automation, National University of Colombia, Bogotá, Colombia, Sep 2000  
Thesis: *Identification of Local Bifurcations in Dynamic Systems*  
Advisor: Hernándo Díaz Morales
- B.S. Mechanical Engineering, National University of Colombia, Bogotá, Colombia, Jul 1995  
Thesis: *Dynamic Analysis of a Positioning Table for Machining Processes Using Bond Graphs*  
Advisor: Fernando Mejía Umaña

## PROFESSIONAL DEVELOPMENT

Certified, Technology Management and Commercialization Strategy, IC2 Institute at the University of Texas, Austin & Monterrey Technology Institute, Apr 2000 – Apr 2001.

## **EMPLOYMENT**

### PURDUE UNIVERSITY

Associate Professor, Mechanical and Motorsports Engineering, Jul 2024 – Present

### INDIANA UNIVERSITY-PURDUE UNIVERSITY INDIANAPOLIS

Associate Professor, Mechanical and Energy Engineering, Aug 2017 – Jun 2024

Adjunct Assistant Professor, Biomedical Engineering, Aug 2015 – Present

Assistant Professor, Mechanical Engineering, Aug 2011 – Aug 2017

### UNIVERSITY OF NOTRE DAME

Adjunct Associate Professor, Aerospace and Mechanical Engineering, Sep 2011 – Aug 2012

Research Assistant Professor, Aerospace and Mechanical Engineering, Aug 2008 – Aug 2011

### NATIONAL UNIVERSITY OF COLOMBIA

Associate Professor, Mechanical and Mechatronic Engineering, Jun 2005 – Aug 2008

- Academic Director, Bogotá Campus, Feb 2007 – Aug 2008

- Department Chair, Mechanical and Mechatronic Engineering, Apr 2005 – Jan 2007

Assistant Professor, Mechanical and Mechatronic Engineering, Dec 2000 – Jun 2005

Associate Lecturer, Mechanical Engineering, Dec 1998 – Dec 2000

Assistant Lecturer, Mechanical Engineering, Dec 1997 – Dec 1998

Teaching Assistant, Mechanical Engineering, Sep 1996 – Dec 1997

### OTHER APPOINTMENTS

Co-Founder, Compostable Plastic Technologies, LLC, Feb 2024 – Present  
Senior Research Fellow, Atomic Industries, May 2022 – Dec 2022 (on Sabbatical leave from IUPUI)  
Founder and General Manager, Complex Design, LLC, Jan 2017 – Present  
Visiting Scholar, Federal University of Rio de Janeiro, Brazil, Dec 2006  
Engineer, Tekniker, Mechatronics and Ultra-precision Eng. Division, Gipuzkoa, Spain, Jan – Dec 1999  
Founder and General Manager, IngeCol Ltd, Colombia, Jun 1994–Jun 1995  
Intern, Internal Combustion Machines Lab, University of Cataluña, Terrassa, Spain, Spring 1995  
Intern, ThermoRex Ltd., Thermo King Co. branch in Bogotá, Colombia, Winter 1994  
Intern, Indumil, Colombian Military Industry, Bogotá, Colombia, Summer 1993

### **SPONSORED RESEARCH**

#### CURRENT PROJECTS

##### **External**

1. U.S. Navy and Candent Technologies, Inc. STTR N22A-T002 Phase II. Title: Analysis and design optimization of a Multifunctional Heat Exchanger for Aerodynamic Aircraft Inlets. Role: PI from IUPUI. IUPUI portion: \$375,000. Dates: Apr 2024 – Apr 2027.

##### **Internal**

2. Purdue University, Office of Undergraduate Research (OUR), Title: Development of thermoplastic starch aerogels using an adaptive experimental design in a Bayesian optimization framework, Role: PI, \$3,000 supporting three undergraduate students, Dates: AY 2024-25.

#### PENDING PROPOSALS

##### **External**

3. NSF. Title: Advancing Digital Twins Through the Integration of Partial Differential Equations into Multi-source, Multiscale, Multi-fidelity Surrogate Modeling. Role: PI, \$794,285, Dates: Jan 2025 – Dec 2027.
4. DOE. Title: Advanced Smart Manufacturing Platform of Battery Systems Integrating Intelligent Digital Twins and Multi-Fidelity Machine Learning, Role: PI, \$3,125,000, Dates: Sep 2024 – Sep 2025.

##### **Internal**

5. None.

#### COMPLETED PROJECTS

##### **External**

6. NASA Indiana Space Grant Consortium (INSGC). Title: Advancing Potato-Derived Thermoplastic Starch Films and Aerogels for Thermal Insulation and Water Resistance in Rocket Aerospace Applications. Role: PI. Effort: 100%. Amount: \$7,000. Dates: Jan 2024 – May 2024.
7. National Science Foundation. Title: REU Site: IUPUI REU Program in nanotechnology. Role: Mentor/Senior Personnel, Andres Tovar (PI: Mangilal Agarwal). Dates: Summer 2023.
8. National Science Foundation. Title: RET Site: IUPUI REU Program in nanotechnology. Role: Mentor/Senior Personnel, Andres Tovar (PI: Mangilal Agarwal). Dates: Summer 2023.

9. U.S. Navy and Candent Technologies, Inc. STTR N22A-T002 Phase I. Title: Analysis and design optimization of a Multifunctional Heat Exchanger for Aerodynamic Aircraft Inlets. Role: PI from IUPUI. IUPUI portion: \$71,000. Dates: Jun 2022 – May 2023.
10. Indiana Technical Assistance Program (INTAP) Phase II (Advanced Renewable Power, LLC (ARP) and NineTwelve Institute, Indiana, Title: Design and Fabrication of an Electric Vehicle Chassis. Role: PI, \$10,000, Dates: Jul 1, 2022 – Dec 31, 2022.
11. The National Academies of Sciences U.S. - Egypt Science and Technology Joint Fund. Title: Developing a Microstructure-based Design and Optimization Software for Lithium-Ion Batteries. Role: co-PI. Effort: 20%. Amount: \$188,424. Dates: Jul 2019 – Jul 2022.
12. Indiana Technical Assistance Program (INTAP) Phase I (Advanced Renewable Power, LLC (ARP) and NineTwelve Institute, Indiana, Title: Design and Fabrication of an Electric Vehicle Chassis. Role: PI, \$6,336, Dates: Aug 31, 2021 – Mar 31, 2022.
13. NSF I-Corps. Title: Microstructure-based Simulation and Optimization Platform to Improve Lithium-Ion Battery Performance. Role: PI. Amount: \$50,000. Dates: Jul 2020 – Jul 2021.
14. National Science Foundation. Title: NRT-IGE: Promoting Creativity in Engineering/Technology Graduate Education. Role: co-PI. Effort: 20%. Amount: \$458,057. Dates: Sep 2016 – Aug 2020.
15. National Science Foundation. Title: REU Site: IUPUI REU Program in mathematics with applications to medical sciences, biophysics, and inverse problems. Role: Mentor/Senior Personnel, Andres Tovar (PI: Julia Arciero). Award: 1559745. Dates: Summer 2020.
16. National Science Foundation. Title: REU Site: Multidisciplinary Research for Undergraduates in Nanomaterials for Energy and Biological Applications. Role: Mentor/Senior Personnel, Andres Tovar (PI: Mangilal Agarwal). Award: 1659688. Dates: Summer 2020.
17. National Science Foundation. Title: REU Site: IUPUI REU Program in mathematics with applications to medical sciences, biophysics, and inverse problems. Role: Mentor/Senior Personnel, Andres Tovar. NSF DMS-1559745. Amount: \$249,994. Dates: 2015-2019.
18. General Motors. Title: Structural multiscale, multimaterial topology optimization for crashworthiness using Extended Hybrid Cellular Automata—Phases II and III. Amount: \$100,000. Role: PI. Effort: 100%. Dates: April 2017 – Dec 2018.
19. Detroit Mercy Dental. Title: The Biomechanical Effects of Implantoplasty on Dental Implant with Compromised Bony Supports: A Finite Element Model. Role: PI. Effort: 100%. Amount: \$5,000. Dates: Sep 1, 2017 – Aug 31, 2018.
20. Honda R&D Americas. Title: Topology Crash Optimization of Progressively Buckling Thin-walled Structures using Tubular Compliant Mechanisms—Improved Conceptual Design using a Target Dynamic Response. Role: PI. Effort: 100%. Amount: \$201,748. Dates: June 2015 – May 2018.
21. Walmart U.S. Manufacturing Innovation Fund. Title: Optimal plastic injection molding tooling design and production through advanced additive manufacturing. Amount: \$291,202. Role: PI. Effort: 35%. Dates: Aug 2014 – Aug 2018.
22. U.S. Army U.S. Army Reserve Education Assistance Program (REAP). Title: Strain-rate sensitive properties of 3D-printed thermoplastics. Amount: \$4,000. Role: PI. Effort: 100%. Dates: May 2017 – Aug 2017.
23. Yamaha Motor Corporation, USA. Donation of a Yamaha Wolverine side-by-side for student projects. Amount: \$15,000 (in-kind). Role: PI. Date: Dec 2016.
24. General Motors. Title: Structural multiscale, multimaterial topology optimization for crashworthiness using Extended Hybrid Cellular Automata. Amount: \$100,000. Role: PI. Effort: 100%. Dates: May 2016 – Nov 2016.
25. U.S. Army REAP. Title: Strain-rate sensitive properties of 3D-printed thermoplastics. Amount: \$4,000. Role: PI. Effort: 100%. Dates: May 2016 – Aug 2016.
26. The Raytheon Foundation. Title: Development and Evaluation Additive Manufacturing Technologies. Amount: \$10,000 (donation). Role: PI. Effort: 100%. Dates: March – Dec 2015.

27. Honda R&D Americas. Title: Nonlinear Crashworthiness Design Tool Development Using Hybrid Cellular Automata. Role: PI. Effort: 100%. Amount: \$139,000. Dates: Apr 2012 – Oct 2014.
28. University of Notre Dame Alumni Association: Design of Robotic Football Players. Role: Advisor. Effort: 100%. Amount: \$5,000. Dates: Aug 2012 – Aug 2014.
29. Air Force Office of Scientific Research (AFOSR), sub-award from the University of Notre Dame. Title: *Nanocomposite Materials Design Optimization with Experimental Validation for Engineered Microstructure at Multiple Length-Scales*. Role: PI. Effort: 100%. Amount: \$70,000. Dates: Oct 2012 – Sep 2013.
30. BISHOP Steering Technology Inc. Title: Development of Advanced Direct-generated G-code CNC program based on NURBS geometry. Role: Co-PI. Effort: 50%. Amount: \$4,000. Dates: Jun - Sep 2013.
31. NASA Indiana Space Grant Consortium (INSGC). Title: Design of space exploration vehicle structures and mechanisms for operation in uncertain environments. Role: PI. Effort: 100%. Amount: \$10,000. Dates: May 2012 – May 2013.
32. U.S. Army TARDEC/Mississippi State University, Simulation Based Reliability and Safety (SimBRS) Program, sub-award from the University of Notre Dame. Title: *Multifunctional Nano-Ceramic Composite Design Optimization and Blast-Worthiness Design Using Hybrid Cellular Automata for Improved Soldier Survivability*. Role: PI. Effort: 100%. Amount: \$61,551. Dates: Aug 2011 – Mar 2012.
33. National Science Foundation (NSF) REU Supplement. Title: GOALI: Hybrid Cellular Automata for Topology and Topography Synthesis in Automotive Structural Design. Role: PI. Effort: 100%. Amount: \$12,000. Dates: May – Jun 2011.
34. National Science Foundation (NSF) REU Supplement. Title: Multiscale Design Tool Development for High Performance Nanocomposites. Role: PI. Effort: 100%. Amount: \$12,000. Dates: May – Jun 2011.

### **Internal**

35. Purdue University, SURF program, Amount: \$6,000 supporting one undergraduate research assistant, Title: Thermoplastic starch aerogel: fabrication and testing of a CO<sub>2</sub> supercritical dryer. Dates: May – Jul 2024.
36. First Year Research Immersion Program (1RIP), Office of Research, IUPUI. Title: Enhancing the Mechanical Properties of Thermoplastic Starch through Adaptive Experimental Design in a Bayesian Optimization Framework. Role: PI. Amount: \$2,000 plus support for two research assistants. Dates: Sep 2023 – May 2024.
37. IUPUI Biomechanics and Biomaterials Research Center (BBRC). Title: Vascularization of 3D bioprinted tissue during formation and maturation. Role: Co-PI (PI: Lester Smith). Amount: \$10,000. Dates: Dec 2021 – Dec 2023.
38. Multidisciplinary Undergraduate Research Institute (MURI). Title: Fabrication of film and 3D-printed objects from potato and corn thermoplastic starch. Role: PI (co-PI: Amanda Siegel, Chemistry). Effort: 50%. Amount: \$16,000. May 2023 – May 2024.
39. Multidisciplinary Undergraduate Research Institute (MURI). Title: Fabrication of film and 3D-printed objects from potato thermoplastic starch. Role: PI (co-PI: Amanda Siegel, Chemistry). Effort: 50%. Amount: \$8,000. AY 2022-23.
40. IUPUI Institute of Integrative Artificial Intelligence (iAI). Title: Machine Learning-Assisted Design of Lithium-Ion Battery Electrodes. Role: PI. Amount: \$20,000. Dates: Jun 2021 – Jun 2022.
41. Multidisciplinary Undergraduate Research Institute (MURI). Title: Processing of compostable plastic for additive manufacturing. Role: co-PI (PI: Amanda Siegel, INDI). Effort: 50%. Amount: \$8,000. Summer 2022.

42. IUPUI CRL Undergraduate Research Opportunity Program (UROP). Title: 3D printing lithium-ion batteries. Role: Mentor. Student: Kourtney Collier. Amount: \$2,500. Dates: AY 2021-22.
43. IUPUI CRL Multidisciplinary Undergraduate Research Institute (MURI). Title: Processing of compostable plastic for additive manufacturing. Role: PI (co-PI: Amanda Siegel, INDI). Effort: 50%. Amount: \$8,000. Dates: AY 2021-22.
44. IUPUI Diversity Scholars Research Program (DSRP). Title: Fused deposition modeling of compostable plastics and lithium-ion batteries. Role: Advisor. Effort: 100%. Student: Kyran Randle. Amount: \$2,500. Dates: AY 2021-22.
45. IN LSAMP-IUPUI. Title: Effect of infill patterns in 3D printed parts. Role: Mentor. Effort: 50%. Amount: \$8,000. Dates: Summer 2021.
46. IUPUI CRL Multidisciplinary Undergraduate Research Institute (MURI). Title: Developing the technology to 3D print with potato starch-based plastic. Role: PI (co-PI: Amanda Siegel, INDI). Effort: 50%. Amount: \$15,000. Dates: Summer 2021.
47. IUPUI CRL Multidisciplinary Undergraduate Research Institute (MURI). Title: Effect of natural fibers in the mechanical properties of starch-based plastic. Role: PI (co-PI: Amanda Siegel, INDI). Effort: 50%. Amount: \$8,000. Dates: AY 2020-21.
48. IN LSAMP-IUPUI. Title: Computational fluid dynamic models for 3D bioprinting. Role: Mentor. Effort: 50%. Amount: \$8,000. Dates: Summer 2020.
49. IN LSAMP-IUPUI. Title: Optimal vehicle design using machine learning. Role: Mentor. Effort: 50%. Amount: \$8,000. Dates: Summer 2020.
50. IUPUI CRL Multidisciplinary Undergraduate Research Institute (MURI). Title: Tailoring Mechanical Properties of Compostable Plastic: Effects of natural plasticizers and initiators. Role: PI (co-PI: Amanda Siegel, INDI). Effort: 50%. Amount: \$15,000. Dates: Summer 2020.
51. IUPUI CRL Multidisciplinary Undergraduate Research Institute (MURI). Title: Processing of compostable plastic. Role: PI (co-PI: Amanda Siegel, INDI). Effort: 50%. Amount: \$8,000. Dates: AY 2019-20.
52. IN LSAMP-IUPUI. Title: Processing potato starch-based plastic. Role: Mentor. Effort: 50%. Amount: \$4,000. Dates: Summer 2020.
53. IUPUI CRL Multidisciplinary Undergraduate Research Institute (MURI). Title: Processing of recycled HDPE and PP in extrusion-based additive manufacturing and injection molding. Role: co-PI (PI: Amanda Siegel, INDI). Effort: 50%. Amount: \$15,000. Dates: Summer 2019.
54. IUPUI CRL Multidisciplinary Undergraduate Research Institute (MURI). Title: Processing of recycled HDPE and PP in extrusion-based additive manufacturing. Role: co-PI (PI: Amanda Siegel, INDI). Effort: 50%. Amount: \$8,000. Dates: AY 2018-19.
55. IUPUI Welcoming Campus Fund. Project Title: Creating a vibrant and inclusive student experience through multidisciplinary design projects and participation in intercollegiate competitions. Role: PI. Amount: \$50,000 (\$25,000 cost-share from the E&T School). Dates: July 15, 2018 – May 15, 2019.
56. IUPUI-FORCES. Title: Chest Tube Securing Device. Amount: \$18,106. Role: Co-PI (PI: Samer Abu-Sultaneh). Dates: Aug 2018 – Jan 2019.
57. IUPUI-RSFG. Title: Characterizing Flow Profiles, Perfusion Characteristics, and Tissue Response of Bioprinted Tissues in a Novel Perfusion Bioreactor System. Role: co-PI. Effort: 30%. Amount: \$35,000. Dates: Jan 2018 – Dec 2018.
58. IUPUI BBRC-INDI. Title: Hybrid Cellular Automaton Model of Complex Cellular Migratory Behavior. Amount: \$5,000. Role: PI. Effort: 100%. Dates: AY 2017-18.
59. IUPUI OVCR Release Time for Research (RTR). Title: Improved crashworthiness in lightweight automotive vehicles through material substitution and shape optimization with carbon fiber-reinforced composites. Phase 2: metamodel-based global optimization. Amount: \$10,000. Role: PI. Effort: 100%. Dates: Jan 2018 – May 2018.

60. IUPUI CRL Multidisciplinary Undergraduate Research Institute (MURI). Title: Application recycled plastic in extrusion-based additive manufacturing. Role: co-PI (PI: Amanda Siegel, INDI). Effort: 50%. Amount: \$15,800. Dates: Summer 2018.
61. IUPUI CRL Multidisciplinary Undergraduate Research Institute (MURI). Title: Suitability of recycled plastic for extrusion-based additive manufacturing. Role: PI, (co-PI: Amanda Siegel, INDI). Effort: 50%. Amount: \$7,000. Dates: AY 2017-18.
62. IUPUI OVCR Funding Opportunities for Research Commercialization and Economic Success (FORCES). Title: Commercialization of a Topology Optimization Algorithm to Design Lightweight, Multi-Functional Components with Optimized Internal Cellular (Porous) Structure. Amount: \$25,000. Role: PI. Effort: 100%. Dates: May 2016 – May 2017.
63. Sports Innovation Institute at IUPUI, Inaugural Grant Program. Title: Design of organic-shaped sport helmets through bioinspired form-finding and optimization algorithms. Role: PI. Effort: 75%. Amount: \$20,000. Dates: Jan 2017 – Dec 2017.
64. Purdue Research Foundation (PRF) International Travel Grant. Amount: \$1,000. Date: Jun 2017.
65. IUPUI CRL Multidisciplinary Undergraduate Research Institute (MURI). Title: Modeling and Validation of Basic Cellular Metabolism in Spheroids Used for Scaffold-Free 3D Bioprinting. Role: co-PI (PI: Nic Moldovan). Effort: 33%. Amount: \$20,000. Dates: Summer 2017.
66. IUPUI OVCR Release Time for Research (RTR). Title: Improved crashworthiness in lightweight automotive vehicles through material substitution and shape optimization with carbon fiber-reinforced composites. Phase 1: material modeling and simulation. Amount: \$10,000. Role: PI. Effort: 100%. Dates: Sep 2016 – Dec 2016.
67. IUPUI CRL Multidisciplinary Undergraduate Research Institute (MURI). Title: Modeling and Validation of Basic Cellular Metabolism in Spheroids Used for Scaffold-Free 3D Bioprinting. Role: co-PI (PI: Nic Moldovan). Effort: 33%. Amount: \$20,000. Dates: AY 2016-17.
68. IUPUI CRL Multidisciplinary Undergraduate Research Institute (MURI). Title: Development of additive manufacturing technologies to 3D print with recycled mixed shredded plastic. Amount: \$15,000. Role: PI (co-PI: Amanda Siegel, INDI). Effort: 50%. Dates: Summer 2016.
69. IUPUI CRL Multidisciplinary Undergraduate Research Institute (MURI). Title: Development of the 3D printing technologies to reduce the cost of filament fused fabrication. Role: PI. Effort: 50%. Amount: \$10,000. Dates: Aug 2015 – Apr 2016.
70. Purdue Research Foundation (PRF) Doctoral Research Grant. Title: Multiscale Topology Optimization of Nonlinear Structures. Role: Research Advisor. Amount: \$18,000. Dates: June 2015 – May 2016.
71. Purdue Research Foundation (PRF) Summer Faculty Grant. Title: Biometric topology optimization algorithms for 3D printed lightweight impact protective structures: From Safer Helmets to Enhanced Vehicle Crashworthiness. Role: PI. Effort: 100%. Amount: \$10,400. Dates: June – July 2015.
72. IUPUI Diversity Scholars Research Program (DSRP). Title: Optimization of IUPUI Robotics Reception Performance via a Semi-Autonomous Control System for Determination of Target Angular Position and Distance. Role: Advisor. Effort: 100%. Student: Anna Glumb Amount: \$2,500. Dates: Sep 2014 – Apr 2015.
73. IUPUI Diversity Scholars Research Program (DSRP). Title: Optimal Plastic Injection Molding Tooling and Production through Advanced Additive Manufacturing. Role: Advisor. Effort: 100%. Student: Ricardo A. Ortiz. Amount: \$2,500. Dates: Sep 2014 – Apr 2015.
74. IUPUI CRL Multidisciplinary Undergraduate Research Institute (MURI). Title: 3D printing optimization for smooth surface generation in complex mechanical components. Role: PI. Effort: 35%. Amount: \$32,000. Dates: AY 2014-2015.
75. RISE Curriculum Development Grant, IUPUI. Title: Development of a Research course on Design of Mechanical Systems. Role: PI. Effort: 100%. Amount: \$2,500. Dates: Aug 2012 – Aug 2014.
76. Purdue Research Foundation (PRF) International Travel Grant. Amount: \$1,000. Date: Sep 2014.



77. IUPUI Diversity Scholars Research Program (DSRP). Title: Design Optimization of Lightweight Crashworthy Structures for Uncertain Collision Scenarios. Role: Advisor. Effort: 100%. Student: Ricardo Ortiz Amount: \$2,500. Dates: Oct 2013 – Apr 2014.
78. IUPUI CRL Multidisciplinary Undergraduate Research Institute (MURI). Title: *Agent-based design of ultra-lightweight materials and components*. Role: PI. Effort: 50%. Amount: \$15,800. Dates: Summer 2013.
79. Purdue Research Foundation (PRF) International Travel Grant. Amount: \$1,000. Date: Sep 2012.
80. IUPUI Diversity Scholars Research Program (DSRP). Title: Crash Analysis and Multidisciplinary Design Optimization of Lightweight Vehicle Chassis: Application to Electric Vehicle Design. Role: Advisor. Effort: 100%. Student: Sara Grimany. Amount: \$2,430. Dates: Oct 2011 – Apr 2012.

### **PATENTS AND INVENTIONS**

1. IURTC Project # 2016-104: Porous 3D Topology Optimization Design Algorithm: A. Tovar, K. Liu, and T. Wu, 2016.
2. IURTC Project # 2016-073: Advanced layered composite for energy dissipation using a 3D lattice of micro compliant mechanism array: A. Tovar and V. Gokhale, 2016.
3. IURTC Project # 2015-080: Computational Design Algorithm: Thermo-Mechanical Topology Optimization: A. Tovar, K. Liu, and T. Wu, 2015.
4. IURTC Project 2015-178: Algorithm for Modeling Solids as Porous Materials in CAD: A. Tovar, K. Liu, and T. Wu, 2015.
5. Invention Disclosure: Electrode Microstructure Optimization. Schubert, P., L. Zhu, and A. Tovar, U.S. Patent Application through IURTC, Filed: June 29, 2014.
6. Provisional U.S. Patent Application No. 61/830: Ultra-lightweight Sinusoidal Blast Mitigating Structure. Tovar, A. and J. Israel, Filed June 4, 2013.
7. IU 13069-2012: Compliant Tubular Structures for Controlled Energy Absorption under Crash. A. Tovar, and P. Bandi, U.S. Patent Application filed: November 2012.0

### **HONORS AND AWARDS**

#### PROFESSIONAL AWARDS

1. IUPUI Athletics Favorite Professor 2022
2. SADCO Our Talent Award 2020
3. IUPUI Athletics Favorite Professor 2020
4. Indiana University Trustees Teaching Award 2019
5. IUPUI Athletics Favorite Professor 2019
6. SHPE STAR Award, Educator of the Year 2018
7. Indiana University Trustees Teaching Award 2016
8. IUPUI Wisner-Stoelk Outstanding Faculty Award 2015
9. Grand Prize Winner, DOE/ARPA-E-Local Motors LITECAR Challenge 2015
10. IUPUI Athletics Favorite Professor 2015
11. SAE Ralph R. Teetor Educational Award 2014
12. Best Faculty Advisor, IUPUI Purdue School of Engineering and Technology 2014
13. IUPUI Athletics Favorite Professor 2014
14. IUPUI Athletics Favorite Professor 2013
15. AIMUM Recognized Department Chair, 2011
16. Young Investigator Award, National University of Colombia, 2005
17. Fulbright Scholar, PhD at the University of Notre Dame, 2004
18. Outstanding Faculty Recognition, Dept. Mechanical Eng., National Univ. of Colombia, 2000

19. CYTED Scholar, Santa Cruz de la Sierra, Bolivia, Summer 1998

### STUDENT AWARDS

20. Honored M.S. Thesis in Industrial Automation, National University of Colombia, 2000
21. Best GPA fellowship, M.S. Industrial Automation, National University of Colombia, Spring 1997
22. Best GPA fellowship, M.S. Industrial Automation, National University of Colombia, Fall 1996
23. Best GPA fellowship, M.S. Industrial Automation, National University of Colombia, Fall 1995
24. First runner up, Undergrad Research Academic Excellence Program, National U of Col, Nov 1995
25. Distinguished B.S. Research Thesis, National University of Colombia, Jun 1995
26. Intercampus Scholar, Latin America–Spain Program, Polytechnic Univ. of Catalonia, Spring 1995
27. Best GPA fellowship, B.S. Mechanical Engineering, National University of Colombia, Fall 1993
28. Best GPA fellowship, B.S. Mechanical Engineering, National University of Colombia, Spring 1993
29. Best GPA fellowship, B.S. Mechanical Engineering, National University of Colombia, Fall 1992
30. Best GPA fellowship, B.S. Mechanical Engineering, National University of Colombia, Spring 1991
31. Best GPA fellowship, B.S. Mechanical Engineering, National University of Colombia, Spring 1990
32. Best GPA fellowship, B.S. Mechanical Engineering, National University of Colombia, Spring 1989

### **MEDIA APPEARANCES AND INTERVIEWS**

(Selected from the last 10 years):

- Purdue University News, Indy Intro: Andres Tovar, [https://youtu.be/HBrenf0ca\\_U](https://youtu.be/HBrenf0ca_U), May 14, 2024.
- Autos y Carreras (Podcast), *Autonomous vehicles in Indianapolis* (Carros autónomos en Indianápolis), <https://t.co/gqPA8Q6Hev>, May 16, 2022.
- Telemundo Indy (TV), *Hispanics invent a low-cost mechanical ventilator*, <https://youtu.be/U1bXlk0ki94>, Jun 28, 2020.
- From the Desk: Engineering and Technology dean shares how COVID-19 challenges are being met, <https://news.iu.edu/live/news/26831-from-the-desk-engineering-and-technology-dean>, Apr 29, 2020.
- News at Indiana University, Mother Nature inspired IUPUI students' design for a safer football helmet, <https://research.iu.edu/news-events/newsletters/enterprise/2019-05-23.html>, May 23, 2019.
- Purdue School of Engineering and Technology, IUPUI places 2nd in the 4th Annual agBOT Challenge, <https://et.iupui.edu/news/2019/iupui-places-2nd-in-the-4th-annual-agbot-challenge>, May 23, 2019.
- Purdue School of Engineering and Technology, IUPUI Team Takes Second Place at agBOT Challenge 2018, <https://et.iupui.edu/news/2018/iupui-team-takes-second-place-at-agbot-challenge-2018>, May 23, 2018.
- Precision Farming (Newspaper), *Autonomy on Display at agBot Challenge*, <https://www.precisionfarmingdealer.com/articles/2203-autonomy-on-display-at-agbot-challenge>, May 23, 2016.
- Modern Farmer (Magazine), *Look, Ma, No Hands! The AgBot Challenge Showcases the Autonomous Future of Agriculture*, <http://modernfarmer.com/2016/05/2016-agbot-challenge/>, May 12, 2016.
- Indianapolis Business Journal, *IUPUI professor's winning car design mimics human rib cage*, <http://www.ijb.com/articles/53297-iupui-professors-winning-car-design-mimics-human-rib-cage>, May 23, 2015.
- DoD Energy.gov, *8 Questions with Dr. Andres Tovar, Winner of ARPA-E's LITECAR Challenge*, <https://energy.gov/articles/8-questions-dr-andres-tovar-winner-arpa-e-s-litecar-challenge>, Apr 30, 2015.
- DoD, ARPA-E LITECAR Challenge: <https://youtu.be/J16zJXrFdPw>, Apr 2015.

- Walmart Media, Walmart U.S. Manufacturing Innovation Fund Awards First Grants, [https://youtu.be/jMtC1mkZ\\_Xs](https://youtu.be/jMtC1mkZ_Xs), Aug 14, 2014.

## **TEACHING**

### PURDUE UNIVERSITY

(Taught 1 undergraduate level course)

- Programming and Computer Modeling for Motorsports (MSPE 29800): Fall 2024

### INDIANA UNIVERSITY-PURDUE UNIVERSITY INDIANAPOLIS

(Taught 6 undergraduate level courses and 5 graduate level courses)

- Fluid Mechanics (ME 31002/EEN 31000): Spr 2024
- Control System Analysis and Design (ME 48200): Fall 2023
- Modeling and Analysis and Dynamic Systems (ME 33000): Spr 2022
- Optimal Design of Mechatronic Systems (ME 59700 developed): Fall 2017, 2018
- Design of Complex and Origami Structures (ME 59700 developed): Spr 2017, 2018, 2019, 2020
- Additive Manufacturing (ME 59700 developed): Fall 2015, 2016, 2017, 2018, 2019, 2020
- Advanced Dynamics (ME 56200): Spr 2015
- Basic Engineering Mechanics (EEN 24000): Spr 2013
- Basic Mechanics II (ME 27400): Fall 2014, 2011, Spr 2023, 2024
- Design of Mechanisms (ME 37200): Spr 2012, Fall 2012, Fall 2013
- Machine Design (ME 45310 developed): Fall 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021
- Optimal Design of Complex Mechanical Syst. (ME 59700 developed): Spr 2014, 2016, 2018, 2020, 2023
- Optimal Design of Complex Mechanical Syst./Bayesian Optimization (ME 60601): Spr 2021, 2022
- Topology Optimization (ME 59700 developed): Sum 2012, 2014, 2015, 2017, 2018, 2019, 2020, 2021

See Course Evaluations in the Appendix.

### UNIVERSITY OF NOTRE DAME

(Taught 3 undergraduate and 2 graduate level courses)

- Design Methodology (AME 30362): Fall 2008
- Introduction to Engineering – Learning Center (EG 11111): Fall 2009
- Introduction to Engineering – Lectures (EG 10111): Fall 2009
- Optimum Design of Mechanical Elements (AME 60661): Spring 2009, Spring 2010
- Topology Optimization (AME 60662): Spring 2011

### NATIONAL UNIVERSITY OF COLOMBIA

(Taught 6 graduate courses and 9 undergraduate courses. Co-lectured over 12 courses in Engineering, Medicine, Applied Mathematics, and Fine Arts)

- Automation of Manufacturing Processes (Senior): Fall 1997
- Biomechanical Engineering (Grad): Spring 2005, Spring 2006, Spring 2007
- Biomedical Engineering Fundamentals for Engineers (Grad): Spring 2007
- Descriptive Geometry (Freshman): Fall 1998, Spring 2000, Fall 2000, Spring 2001
- Engineering Fundamentals for non-Engineers (Grad): Spring 2007
- Finite Element Analysis (Senior): Spring 2005

- Graduate Research Seminar in Biomechanics (Grad): Fall 2007
- Graduate Research Seminar in Optimization (Grad): Fall 2007
- Mechanical Technology (Freshman): AY 1996, 1997, 1998
- Machine Design (Senior): Fall 1998, Spring 2000, Fall 2000, Spring 2001
- Machining Processes (Senior): Fall 1997
- Mechatronic Design (Senior): Spring 2011
- Optimal Design of Industrial Processes (Grad): Fall 2004, Fall 2005, Fall 2006, Summer 2007
- Technical Drawing (Freshman): Fall 1998, Spring 2000, Fall 2000, Spring 2001

### INVITED SEMINARS

1. Tovar, A., *Optimizing Thermoplastic Starch for Liquid Deposition Modeling Using Bayesian Adaptive Experimental Design*. NNCI NANO + AM SUMMIT, University of Louisville, Louisville, KY, July 30, 2024.
2. Tovar, A., *Generative design, topology optimization, and Bayesian optimization*. Prof. Krishnan Suresh's Topology Optimization course, University of Wisconsin, Madison, WI, Nov 22, 2022.
3. Valladares, H., L. Zhu, H. El-Mounayri, and A. Tovar. *Machine Learning-assisted design of lithium-ion batteries*. Indiana Artificial Intelligence Week, Indianapolis, IN, Sep. 3, 2021 (Speaker).
4. Tovar, A., *Topology Optimization and Generative Design of Lightweight Structures*. XI Jornada de Mecánica, Universidad Distrital Francisco José de Caldas, Bogotá, Colombia, Nov 26, 2020 (Seminar Speaker).
5. Tovar, A., *Topology Optimization for Mechatronics Design*. Universidad de San Buenaventura, Bogotá, Colombia, Nov 17, 2020 (Master lecture)
6. Tovar, A., *Lessons from natural materials and the design of engineering structures*. International Research Conference on Health Science, Education, and Music (CINVEST), Juan N. Corpas University Foundation, Bogota, Colombia, Nov 13, 2020 (Keynote speaker)
7. Tovar, A., *Design of lightweight vehicle structures for crashworthiness using Bayesian optimization and generative design*. 7 Day International Webinar on Recent Trends in Automotive Technologies, VIT Vellore India, Webinar, Nov 2, 2020.
8. Tovar, A., *Cellular dynamic models and design of engineering structures*. Biomedical Engineering, IUPUI, Oct 30, 2020.
9. Andres Tovar, Sohel Anwar, Michael Golub, Mohammad Hasan, Cory Robinson, Chad Eby. *Vibrant and Inclusive Student Experience Through Multidisciplinary Intercollegiate Student Competitions*. IUPUI Welcoming Campus Conference, Indianapolis, IN, May 16, 2019.
10. Tovar, A., *Complex design*. Faculty Spotlight. Dean's Industrial Advisory Council (DIAC), May 2, 2019.
11. Tovar, A., *Plastic injection with 3D-printed molds*. Carmel Clay Library Digital Media Lab, 2019 3D Printing Expo, Carmel, Indiana, Mar 2, 2019.
12. Tovar, A., *Art and bio-inspired design*. IUPUI 50th Anniversary Birthday Bash, Research Panel, Indianapolis, Indiana, Jan 24, 2019.
13. Tovar, A., *Design of lightweight vehicle structures using lessons from nature*. SHPE 2018 National Convention, Cleveland, Ohio, Nov 7-11, 2018.
14. Tovar, A., *Design of Cellular Structures for Crashworthiness*. Seminar at the University at Buffalo, Buffalo, New York, Nov 1, 2018.
15. Tovar, A., *Design of Origami and Complex Structures*. Rolls-Royce, Indianapolis, Indiana, Jun 29, 2018.
16. Tovar, A. and S. Anwar, *Integration of Engineering, Technology, and Arts in Graduate-level Education*. Allegion Plc, Carmel, Indiana, Jan 23, 2018.

17. Tovar, A. and T. Wu, *How Additive Manufacturing is Transforming the Plastic Processing Industry*. Logitech, May 22, 2017
18. Tovar, A., *Design of complex structures and additive manufacturing*, SENA, Cali, Colombia, Dec 13 and 14, 2016
19. Tovar, A., *Control-Based Structural Design for Crashworthiness Using Cellular Automata*, Electrical and Computer Engineering Research Seminar, IUPUI, Nov 9, 2016.
20. Tovar, A., *Leadership Symposium Panel*, IUPUI Engr. and Technology, Oct 12, 2016
21. Tovar, A., *NSF, NIH, and industry grant applications*, IUPUI Engr. and Technology Convocation, Aug 19, 2016
22. Tovar, A., *Sustainable 3D Printing*. Indy's Open Source Circular Economy (OSCE) Days 2016, Indianapolis, IN, June 9-13, 2016
23. Tovar, A., *Design and Art in Engineering*. Thompson Crossing Elementary, Southeast Marion County, IN, Apr 28, 2016
24. Tovar, A., *Topology optimization of cellular materials: from lightweight vehicles and porous injection molds to prosthesis and scaffolds*. Biomedical Engineering Research Seminar, IUPUI, Apr 8, 2016
25. Tovar, A., *Bioinspired design of impact-protective structures: from safer helmets to lightweight automotive structures*. International Research Conference on Health Science, Education, and Music (CINVEST), Paipa, Colombia, Nov 19-20, 2015 (Keynote speaker)
26. Tovar, A., *Bio-inspired structural design*. IUPUI Biology Fall Research Seminar, Sep 11, 2015.
27. Tovar, A., *Advances in Optimal Design of Structures for Crashworthiness*. General Motors Corporation. Warren, Michigan, May 22, 2015
28. Tovar, A., *Design for Additive Manufacturing (3D Printing)*. The Sciencetech Club. Indianapolis, Indiana, May 11, 2015
29. Tovar, A., *Design for crashworthiness*. 4th Symposium for Design Optimization and Simulation-Based Design, New Advancements, Technology and Future, Northwestern University, Evanston, Illinois. Dec 5, 2014
30. Tovar, A., *Mathematical programming in topology optimization*. University of Illinois at Urbana-Champaign, Dept. of Civil and Environmental Engineering. Invited by Prof. G.H. Paulino. Nov 20, 2014
31. Tovar, A., *Optimal design and additive manufacturing (3D printing) of ultra-lightweight structures*. Raytheon, Indiana, Jun 4, 2014.
32. Tovar, A., *Mathematical programming in topology optimization*. University of Illinois at Urbana-Champaign, Dept. of Civil and Environmental Engineering. Invited by Prof. G.H. Paulino. Nov 12, 2013
33. Tovar, A., *Welcome to Engineering freshmen students*. Purdue School of Engineering & Technology at IUPUI, Indianapolis, IN, Aug 13, 2013.
34. Tovar, A., *Mathematical programming in topology optimization*. University of Illinois at Urbana-Champaign, Dept. of Civil and Environmental Engineering. Invited by Prof. G.H. Paulino. Nov 27, 2012.
35. Tovar, A., *Emerging Technologies in Engineering*. Society of Hispanic Professional Engineers, IUPUI Chapter Indianapolis, IN, Apr 19, 2012.
36. Tovar, A., *Structural and Material Optimization*. IUPUI Mechanical Engineering Dept. Industry Advisory Board Meeting, Indianapolis, IN, Dec 16, 2011.
37. Tovar, A., *In Memoriam John Eldon (Jack) Renaud*. ASME International Design Engineering Technical Conference & Computers and Information in Engineering Conference (IDETC 2011), Washington, DC. Aug 28–31, 2011

38. Tovar, A., *Topology Optimization of Nonlinear Structures Subject to Impact*. 5th International Conference on Mechanical Engineering (CIMM 2011), Bogotá, Colombia, Aug 11–12, 2011 (Keynote speaker).
39. Tovar, A., *Hybrid Cellular Automata: From Bone Remodeling to Crashworthiness Design*. 2nd Symposium for Design Optimization and Simulation-Based Design, New Advancements, Technology and Future, Northwestern University, Evanston, Illinois. Dec 8, 2010.
40. Tovar, A., *Cellular Automata and Other Emerging Technologies in Design Optimization*. Society of Women Engineers, Professional Development Conference, Fort Wayne, Indiana. Mar 20, 2010.
41. Tovar, A., *Crashworthiness Design Using Topology Optimization*. Symposium for Design Optimization and Simulation-Based Design, New Advancements, Technology and Future, Northwestern University, Evanston, Illinois, Nov 11, 2008.
42. Tovar, A., *Biomechanics, Biomechatronics and Other Emerging Technologies*. 20th Show of Machines and Prototypes, College of Engineering, National University of Colombia, Bogotá, Colombia. April 27, 2007.
43. Tovar, A., *Structural Optimization with HCA*. Invited by the Department of Mechanical Engineering. Worked with Dr. José Herskovits, Federal University of Rio de Janeiro, Brazil. Dec 7, 2006.
44. Tovar, A., *Mechanics, Biomechanics and Biomechatronics*. Symposium on Mechanical Engineering, Celebration of 145th Anniversary of the College of Engineering, National University of Colombia, Nov 24, 2006.
45. Tovar, A., *Artificial Limb Design*. Keynote speaker at the Engineering Week, Saint Thomas Aquinas University, Bogotá, Colombia. Nov 16, 2006.
46. Tovar, A., *Prosthetic Design and Bone Remodeling*. Research Meeting on Mechanical Engineering. University of Ibagué–Cooruniversitaria. Ibagué, Colombia. October 13, 2006.
47. Tovar, A., *Support of Modeling to Solve Problems in Engineering*. Seminar on *Engineering Problems: Making Science Work*. College of Engineering, National University of Colombia, Bogotá, Colombia. Oct 5, 2006
48. Tovar, A., *Technology for Prosthetic Design and Manufacturing*. Presentation of Projects Founded by the Research Division of the National University of Colombia, Bogotá, Colombia. October 12, 2006.
49. Tovar, A., *Structural Optimization with Hybrid Cellular Automata*. Third International Conference on Mechanical Engineering and First on Mechatronic Engineering (CIMM 2006). Bogotá, Colombia. Sep 20–22, 2006.
50. Tovar, A., *Simulation of the Process of Bone Functional Adaptation Using HCA*. First Bi-national Congress Colombia–Venezuela on Mechanical and Industrial Engineering. Mérida, Venezuela, May 18–20, 2006
51. Tovar, A., *Computational Models of the Human Body and Cellular Automata*. Colombian Society for the Development of Science (ACAC), Expociencia – Expotecnología, Bogotá, Colombia, Oct 18, 2005.

## POSTER PRESENTATIONS

(Selected from last 10 years)

1. Gracie M. White, Sevinch Pasilova, Anthony Stanich, Amanda P. Siegel, Andres Tovar. *Variational Gaussian Process Regression in a Bayesian Adaptive Experimental Design Framework to Accelerate the Discovery of Optimal Thermoplastic Starch Formulations*. ACS Fall 2024, Denver, CO, Aug 18–22, 2024. **Outstanding Poster Award**.
2. Gracie M. White, Sevinch Pasilova, Anthony Stanich, Amanda P. Siegel, Andres Tovar. *Variational Gaussian Process Regression in a Bayesian Adaptive Experimental Design Framework to Accelerate the Discovery of Optimal Thermoplastic Starch Formulations*. Indiana University Indianapolis, Research Experience for Undergraduate Students, Indianapolis, IN, Aug 2, 2024.

3. Anthony Stanich, Gracie M. White, Sevinch Pasilova, Amanda P. Siegel, Andres Tovar. *Effect of Chitin and Chitosan in Biological Sourced Thermoplastic Starch Films*. Indiana University Indianapolis, Research Experience for Teachers, Indianapolis, IN, Jul 19, 2024.
4. London Williams, Aidan Weileder, Amanda P. Siegel, Andres Tovar. *Effects of Glycerol and Sorbitol Plasticizers on the Mechanical Properties of Thermoplastic Cornstarch*. Indiana University Indianapolis, Research and Creative Activities Day, Indianapolis, IN, Apr 19, 2024.
5. Jake Staker, Gracie White, Jacob Patenaude, John Waggle, Haiquan Guo, Amanda P. Siegel, Andres Tovar. *Low Earth Orbit Testing of Compostable Thermoplastic Starch Aerogels*. Indiana University Indianapolis, Research and Creative Activities Day, Indianapolis, IN, Apr 19, 2024.
6. Gracie White, Prerona Kaushik, Amanda P. Siegel, Andres Tovar. *Multi Objective Bayesian Optimization To Enhance The Mechanical Properties of Potato Starch-Based Thermoplastic Films*. Indiana University Indianapolis, Research and Creative Activities Day, Indianapolis, IN, Apr 19, 2024.
7. Mayank Malhotra, Andie Meyer, Amanda P. Siegel, Andres Tovar. *Effects of Calcium Chloride on the Mechanical Properties of Potato Starch Based Thermoplastics*. Indiana University Indianapolis, Research and Creative Activities Day, Indianapolis, IN, Apr 19, 2024.
8. Scott A. Lohman, Mayank Malhotra, Theresa E. Marks, Gracie White, Andres Tovar, Amanda P. Siegel. *An Analysis of The Effects That Calcium Chloride Has on Potato Starched Based Thermoplastics Using a Full Factorial Design of Experiments*. 29th Indiana University Undergraduate Research Conference (IUURC), Jeffersonville, IN, Dec 8, 2023.
9. Jake Staker, Ellyssa Purdy, Gracie White, Haiquan Guo, Jagadeep Thota, Amanda P. Siegel, Andres Tovar. *Potato Thermoplastic Starch Aerogels for Insulation and Hydro-Protection Appliances in High Powered Rocketry*. 29th Indiana University Undergraduate Research Conference (IUURC), Jeffersonville, IN, Dec 8, 2023. Received Poster Presentation Award.
10. Gracie White, Theresa E. Marks, Scott A. Lohman, Mayank Malhotra, Aidan Weileder, London Williams, Amanda P. Siegel, Andres Tovar. *Enhancing the Mechanical Properties of Thermoplastic Starch Films using an Adaptive Experimental Design Approach supported by Bayesian Machine Learning*. 29th Indiana University Undergraduate Research Conference (IUURC), Jeffersonville, IN, Dec 8, 2023. Received Poster Presentation Award.
11. Prathamesh Chaudhari, Joel Najmon, Andres Tovar. *Optimal Design of Radiator using CAD Automation and Multi-Physics Multi-Objective Bayesian Optimization Framework*. Indianapolis Motorsports Conference (IMC), Indianapolis, IN, Dec 6, 2023.
12. Karim ElSayed, Joel Najmon, Andres Tovar, Jitesh Panchal. *Information Embedded Manufacturing via Homogenization-based Topology Optimization*. Indianapolis Motorsports Conference (IMC), Indianapolis, IN, Dec 6, 2023.
13. Aakash Gup, Andres Tovar. *Topology Optimization of Multibody Systems Undergoing Dynamic Loading using an Equivalent Static Displacement Method*. Indianapolis Motorsports Conference (IMC), Indianapolis, IN, Dec 6, 2023.
14. Jake Staker, Elyssa Purdy, Haiquan Guo, Jagadeep Thota, Andres Tovar, Amanda P. Siegel. *Biodegradable Plastics in Rocket Aerospace Applications*. American Astronautical Society (AAS) von Braun Space Exploration Symposium, Huntsville, AL, Oct. 26, 2023.
15. Jake Staker, Elyssa Purdy, Haiquan Guo, Jagadeep Thota, Andres Tovar, Amanda P. Siegel. *Potato Thermoplastic Starch Aerogels for Aerospace Applications*. Midwest Nano Day Symposium, Indiana University-Purdue University Indianapolis, Indianapolis, IN, Oct 9, 2023.
16. Scott Lohman, Mayank Malhotra, Theresa Marks, Gracie White, Andres Tovar, Amanda P. Siegel. *Analysis of the Effect of Calcium Chloride on Potato Starch-based Thermoplastic*. 2023 ACS Think Like a Molecule Poster Session, Marian University, Indianapolis, IN, Sep 21, 2023.
17. Gracie White, Theresa Marks, Scott Lohman, Mayank Malhotra, Amanda P. Siegel, Andres Tovar. *Effect of Plasticizer and Starch Content on the Mechanical Properties of Potato-based Thermoplastic*

- Starch Films*. 2023 ACS Think Like a Molecule Poster Session, Marian University, Indianapolis, IN, Sep 21, 2023.
18. Theresa Marks, Gracie White, Scott Lohman, Mayank Malhotra, Amanda P. Siegel, Andres Tovar. *Adaptive Design of Experiments with Bayesian Optimization for Material Discovery with Thermoplastic Starch Films*. NSF Research Experiences for Undergraduates (REU) program presentation at IUPUI, Indianapolis, IN, Aug 4, 2023.
  19. Theresa Marks, Gracie White, Scott Lohman, Mayank Malhotra, Amanda P. Siegel, Andres Tovar. *Adaptive Design of Experiments with Bayesian Optimization for Material Discovery with Thermoplastic Starch Films*. IUPUI CRL Summer Research Symposium, Indianapolis, IN, Jul 28, 2023.
  20. Scott A. Lohman, Mayank Malhotra, Theresa E. Marks, Gracie White, Andres Tovar, Amanda P. Siegel. *Analyzing Effects of Calcium Chloride on Potato Starch Based Thermoplastics using a Full Factorial Design of Experiments*. Poster and oral presentation. IUPUI CRL Summer Research Symposium, Indianapolis, IN, Jul 28, 2023.
  21. Gracie White, Theresa E. Marks, Scott A. Lohman, Mayank Malhotra, Amanda P. Siegel, Andres Tovar. *Effect of Plasticizer and Starch Content on the Mechanical Properties of Potato-based Thermoplastic Starch Films*. IUPUI CRL Summer Research Symposium, Indianapolis, IN, Jul 28, 2023.
  22. Vanessa Gee and Andres Tovar. *Kitchen Plastics: Can you make plastic at home?* NSF Research Experiences for Teachers (RET) Research Experience for Teachers Advancement in Nanotechnology (RETAIN) program presentation at IUPUI, Indianapolis, IN, July 21, 2023.
  23. Kourtney Collier, Jake Staker, Riya Singh, Eric Collier, Anum Ansar, Andres Tovar, Amanda P. Siegel. *Reducing the Shrinkage and Warpage of 3D-printed Thermoplastic Starch Parts by Freezing*. ACS Spring 2023, Crossroads of Chemistry, Indianapolis, IN, Mar 26-30, 2023.
  24. Kourtney Collier, Riya Singh, Jake Staker, Eric Collier, Anum Ansar, Andres Tovar, Amanda P. Siegel. *Plasticizing Capabilities of Glycerol:Acetic Acid and Choline Chloride:Urea in Potato Thermoplastic Starch Film*. ACS Spring 2023, Crossroads of Chemistry, Indianapolis, IN, Mar 26-30, 2023.
  25. Jake Staker, Zhen Hong Tan, Sydney Schott, Riya Singh, Eric Collier, Anum Ansar, Kourtney Collier, Andres Tovar, Amanda Siegel. *Evaluation of Potato Starch-Based Mulch Sheets for Agricultural Growth*. ACS Spring 2023, Crossroads of Chemistry, Indianapolis, IN, Mar 26-30, 2023.
  26. Kourtney Collier, Jake Staker, Riya Singh, Eric Collier, Anum Ansar, Amanda P. Siegel, Andres Tovar. *Characterization of 3D-Printed Thermoplastic Starch Parts Reinforced with Hemp Fibers*. 2023 ASM Indianapolis Chapter Spring Conference, Indianapolis, IN, Feb 10, 2023.
  27. Eric Collier, Kourtney Collier, Jake Staker, Riya Singh, Anum Ansar, Andres Tovar, Amanda P. Siegel. *Reduction of Warpage and Shrinkage of 3D-Printed Thermoplastic Starch Parts via Freezing*. 28th Indiana University Undergraduate Research Conference IUURC, Indianapolis, IN, Dec 9, 2022.
  28. Anum Ansar, Riya Singh, Kourtney Collier, Eric Collier, Jake Staker, Andres Tovar, Amanda P. Siegel. *Influence of the Plasticizer in Thermoplastic Starch Bags Fabricated by Heat Sealing*. 28th Indiana University Undergraduate Research Conference IUURC, Indianapolis, IN, Dec 9, 2022.
  29. Ximena Andrea Quevedo Martinez, Camilo Andres Cortes Garzon, Andres Hoyos, Jhon Perez, Santiago Triana Sotelo, Sohel Anwar, Andrea Tovar and Jaime Arcos-Legarda. *Active Disturbance Rejection Control for a Self-Driven Race Car in the Indy Autonomous Challenge*. IEEE Latin American Electron Devices Conference (LAED) 2022. Puebla, Mexico, Jul 4-6, 2022.
  30. Jake Staker, Riya Singh, Kourtney Collier, Sarah Franklin, Andres Tovar, Amanda P. Siegel. *Evaluation of Potato Starch-Based Plastic for use in Liquid Deposition Modeling*. ACS Central Regional Meeting (CERM), Ypsilanti, Michigan, Jun 7-10, 2022.
  31. Riya Singh, Jake Staker, Kourtney Collier, Sarah Franklin, Andres Tovar, Amanda P. Siegel. *Techniques for improving mechanical and material properties of potato starch bio-based plastic film*.



- ACS Central Regional Meeting (CERM), Ypsilanti, Michigan, Jun 7-10, 2022. Mia Sosa, Kourtney Collier, Amanda P. Siegel, Andres Tovar. *Effects of Starch and Glycerin Mass Ratios on the Mechanical Properties of Manually Extruded Potato Starch-Based Plastics*. IUPUI CRL Student Research and Creative Activities Day 2022, Indianapolis, Indiana, Apr 22, 2022.
32. Kourtney Collier, Hua Wang, Amanda P. Siegel, Likun Zhu, Andres Tovar. Fabrication and characterization of 3D cathodes for increased capacity of Lithium-ion battery cells. Poster and oral presentations. IUPUI CRL Student Research and Creative Activities Day 2022, Indianapolis, Indiana, Apr 22, 2022.
  33. Jake Staker, Riya Singh, Kourtney Collier, Sarah Franklin, Andres Tovar, Amanda P. Siegel. *Pelletization of Potation Starch-Based Plastic for Injection Molding*. Poster and oral presentations. IUPUI CRL Student Research and Creative Activities Day 2022, Indianapolis, Indiana, Apr 22, 2022.
  34. Riya Singh, Jake Staker, Kourtney Collier, Sarah Franklin, Andres Tovar, Amanda P. Siegel. *Processing and Mechanical Characterization of Potato Starch-Based Plastic Film Sealing*. Poster and oral presentations. IUPUI CRL Student Research and Creative Activities Day 2022, Indianapolis, Indiana, Apr 22, 2022.
  35. Austin Owens, Brendon Shelton, Andres Tovar. *Effect of Infill Patterns on the Mechanical Properties of 3D Printed Parts by Fused Deposition Modeling*. 2021 Louis Stokes Midwest Regional Center of Excellence (LSMRCE) Virtual Conference. Oct 22-24, 2021. Competitive Poster Session, Oct 23, 2021. **Best Poster Award**.
  36. Chelsea Uyeno, Sidnee Zeiser, Regan Dwenger, Amanda Siegel, Andres Tovar. *The Effects of Reaction, Reduction, and Dehydration Methods in Potato Starch-Based Plastic Film Quality*. IUPUI CRL Research Day 2021. Indianapolis, Indiana, Apr 4, 2021.
  37. Elysa Thompson and Andres Tovar. *Computational fluid dynamics of 3D-printed tissues*. IN LSAMP 2020 Annual Research Conference, Indianapolis, Indiana, Oct 3, 2020.
  38. Kourtney Collier, Samantha Goins, Austin Chirgwin, Isabelle Stanfield, Amanda Siegel, and Andres Tovar. *Effect of Dehydration Methods in Starch-Based Plastics*. IUPUI CRL Summer Symposium, Indianapolis, Indiana, July 30, 2020.
  39. Alexis Hecker, Kourtney Collier, Salvador Rodriguez, Sarah Smith, Ashlee Gibson, Kaycee Hammond, Amanda Siegel, and Andres Tovar. *Mechanical and Chemical Characterization of Potato Starch-Based Plastics*. IUPUI CRL Summer Symposium 2020, Indianapolis, Indiana, July 30, 2020.
  40. Salvador F. Rodriguez Valle and Andres Tovar. *Production of Potato Starch-Based Bioplastic*. IUPUI CRL Summer Symposium 2019, Indianapolis, Indiana, Jul. 25, 2019.
  41. Aaron Scheiner, Thomas Shomer, T.J. Segó, and Andres Tovar. *Multi-material Topology Optimization using a Cellular Potts Model*. IUPUI CRL Summer Symposium 2019, Indianapolis, Indiana, Jul. 25, 2019.
  42. Shelby Bowmer, Elexis Shields, Zain Akbar, Kate Edler, Jason Smith, Mangilal Agarwal, Andres Tovar, and Amanda Siegel. *Chemical and Mechanical Characterization of Virgin and Recycled HDPE for use in Additive Manufacturing and Injection Molding*. IUPUI CRL Summer Symposium 2019, Indianapolis, Indiana, Jul. 25, 2019. **Best Poster Award**.
  43. Jason Smith, Kate Edler, Zain Akbar, Elexis Shields, Shelby Bowmer, Mangilal Agarwal, Andres Tovar, and Amanda Siegel. *Mechanical Characterization of Virgin and Recycled HDPE and LDPE for use in Additive Manufacturing and Injection Molding*. IUPUI CRL Summer Symposium 2019, Indianapolis, Indiana, Jul. 25, 2019.
  44. Valladares, H., J. Najmon, and A. Tovar. *Structural Optimization of Thin-Walled Tubular Structures for Progressive Collapse Using Hybrid Cellular Automaton with a Prescribed Response Field*, 3rd Annual Engineering and Technology Leadership Symposium, Indianapolis, Indiana, Nov 16, 2018.
  45. Segó, T.J., J.A. Glazier, A. Tovar. *A Hybrid Kinetic Monte Carlo Method to Predict Extracellular Matrix Remodeling and Induction Processes in Biology and Biofabrication*, 3rd Annual Engineering and Technology Leadership Symposium, Indianapolis, Indiana, Nov 16, 2018.

46. Cardona, C., S. Anwar, and A. Tovar. *Optimal design of self-unfolding origami structures*. SHPE 2018 National Convention, Cleveland, Ohio, Nov 7-11, 2018.
47. Rachel Cadle, Kaylee Crowell, Matthew Joseph, Pratik Rath, Andres Tovar, and Amanda Siegel. *Comparing Mechanical Properties of PLA and Recycled HDPE for Fused Deposition Modeling in Additive Manufacturing*. IUPUI CRL Summer Symposium 2018, Jul. 26, 2018.
48. Pratik Rath, Matthew Joseph, Rachel Cadle, Kaylee Crowell, Andres Tovar, Amanda Siegel. *Novel Blends of Recycled HDPE for Fused Deposition Modeling obtained through the Addition of Tri-Co Block Polymerization with PP*. IUPUI CRL Summer Symposium 2018, Jul. 26, 2018. Sarah Pugliese, A. Tovar. *Investigation of Phase Field Methods in Topology Optimization*. IUPUI CRL Summer Symposium 2018, Jul. 26, 2018.
49. Sophia Kardadi, A. Tovar. *The Level Set Method in Topology Optimization*. IUPUI CRL Summer Symposium 2018, Jul. 26, 2018.
50. John Rowe, A. Tovar. *Adjoint Methods in Topology Optimization*. IUPUI CRL Summer Symposium 2018, Jul. 26, 2018.
51. Sego, T.J., Y-T. Hsu, T-M. G. Chu, A. Tovar. *Multiscale Modeling of Peri-implant Bone Remodeling using Finite Element Analysis*, American Association for Dental Research/Canadian Association for Dental Research Annual Meeting and Exhibition, Ft. Lauderdale, Florida, Mar 22, 2018.
52. Cardona-Serrano, C., A. Siegel, A. Tovar. *Additive Manufacturing with recycled plastic from everyday household items*. IUPUI Center for Research and Learning, Division of Undergraduate Education, Indianapolis, Nov. 17, 2017.
53. Valladers-Guerra, H., A. Jones, A. Tovar. *Surrogate-Based Global Optimization of Composite Material Parts under Dynamic Loading*. 2nd Annual School of Engineering & Technology Leadership Symposium, Indianapolis, Oct 11, 2017.
54. Najmon, J., V. Gokhale, P. Tapkir, A. Tovar. *Design of Sport Helmet Liner through the Topology Optimization of a Compliant Mechanism Lattice Structure*. 2nd Annual School of Engineering & Technology Leadership Symposium, Indianapolis, Oct 11, 2017.
55. Liu, K., D. Detwiler, A. Tovar. *Design of Protective Vehicle through Multiscale Structural Optimization*. 2nd Annual School of Engineering & Technology Leadership Symposium, Indianapolis, Oct 11, 2017.
56. Raeisi, S., P. Tapkir, A. Tovar. *Topology design of crashworthy structures for minimum peak crushing force and penetration*. 2nd Annual School of Engineering & Technology Leadership Symposium, Indianapolis, Oct 11, 2017.
57. Tong, W., A. Tovar. *Multiscale, thermomechanical topology optimization of self-supporting cellular structures for porous injection molds*. 2nd Annual School of Engineering & Technology Leadership Symposium, Indianapolis, Oct 11, 2017.
58. U. Kasacheuski, D. Hauersperger, T.J. Sego, A. Tovar, N. Moldovan. *Performance Optimization of a Hybrid Cellular Automaton Model of Cell Spheroids Fusion and Metabolism during Scaffold-free Bioprinting*, IUPUI Research Day, Indianapolis, Indiana, Apr 7, 2017.
59. Luther, L, U. Kasacheuski, Q. Deng, J. Zhou, A. Siegel, A. Tovar. *Suitability of Recycled ABS-HDPE Plastic Blends for Extrusion-based Additive Manufacturing*. IUPUI Nanotechnology Research Forum and Poster Symposium, Indianapolis, IN, USA, Nov 18, 2016.
60. Sego, T.J., U. Kasacheuski, N. Moldovan, A. Tovar. *Hybrid Cellular Modeling of Cellular Dynamics and Metabolism*, Nanotechnology Research Forum and Poster Symposium, Indianapolis, Indiana, Nov 18, 2016.
61. Sego, T.J., U. Kasacheuski, A. Tovar, N. Moldovan. *Hybrid Cellular Automata Modeling of Cellular Dynamics and Metabolism*. International Biofabrication 2016 Conference, Wake Forest Institute, Winston-Salem, North Carolina, Oct 29-31, 2016.
62. Sego, T.J., U. Kasacheuski, A. Tovar, N. Moldovan. *Hybrid CA Modeling of Cellular Dynamics and Metabolism*. IUPUI 3D Bioprinting Core Symposium, Oct 21, 2016.

63. Sego, T.J., U. Kasacheuski, N. Moldovan, A. Tovar. *Hybrid CA Modeling of Cellular Dynamics and Metabolism*. 1st Annual School of Engineering & Technology Leadership Symposium, Indianapolis, Oct 12, 2016.
64. Wu, T., S.A. Jahan, Y. Zhang, H. El-Mounayri, J. Zhang, D. Acheson, R. Nalim, A. Tovar. *Optimization of Multiphase Lattice Structures Subjected to Thermal and Mechanical Loads*. 1st Annual School of Engineering & Technology Leadership Symposium, Oct 12, 2016.
65. Chaudhari, P., P. Tapkir, A. Tovar. *Optimal Design of Lightweight Crashworthy Structures for Improved Energy Absorption*. 1st Annual School of Engineering & Technology Leadership Symposium, Oct 12, 2016.
66. Allen, T, and A. Tovar. *The Development of a Wireless Control System for Integration on Drones*. 2015 IUPUI Research Day, Indianapolis, Indiana, Apr 17, 2015.
67. Solis-Ocampo, J., H. Valladares, A. Tovar. *Multimaterial Topology Optimization with Ordered SIMP Interpolation*. 1st Annual School of Engineering & Technology Leadership Symposium, Oct 12, 2016.
68. Liu, K., D. Detwiler. A. Tovar. *Design of Protective Vehicle through Multiscale Structural Optimization*. 1st Annual School of Engineering & Technology Leadership Symposium, Oct 12, 2016.
69. Sego, T.J., Y. T. Hsu, T. M. Gabriel Chu, and A. Tovar. *On the Significance and Predicted Functional Effects of the Crown-to-Implant Ratio: a Finite Element Study of Long-Term Implant Stability Using High-Resolution, Nonlinear Numerical Analysis*. IUPUI Research Day 2016, Indianapolis, IN, Apr 8, 2016.
70. Isaacs, A., D. Rodriguez-Gambetta, C. Cardona-Serrano, C. Marko, X. Zongying, and A. Tovar. *Determining Optimal Characteristics of Filament for Fused Filament Fabrication (FFF) 3D Printing Technology*. IUPUI Research Day 2016, Indianapolis, IN, Apr 8, 2016.
71. Liu, K., Z. Xu, A. Tovar, D. Detwiler. *Discovering Protective Vehicle Designs through Multiscale Structural Optimization*. Poster session, Joint Board of Advisors Meeting, Oct 13, 2015.
72. Cardona-Serrano, C. and A. Tovar. *Design of Transmission Systems for Additive Manufacturing Demonstrated by the 3D Printing of a Harmonic Drive*. 29th Annual National Conference on Undergraduate Research (NCUR 2015), Spokane, WA, April 16-18, 2015.
73. Wu, T., S.A. Jahan, P. Kumar, A. Tovar, H. El-Mounayri, Y. Zhang, J. Zhang, D. Acheson, K. Brand, R. Nalim. *Design Optimization of Injection Molds with Conformal Cooling for Additive Manufacturing*. Poster session, IUPUI Research Day 2015, Indianapolis, IN, Apr 17, 2015.
74. Allen, T., and A. Tovar. *The Development of a Wireless Control System for Integration on Drones Engineering and Technology*. IUPUI Research Day 2015, Indianapolis, IN, Apr 17, 2015.
75. Ozdemir, H, D. Rodriguez-Gambetta, J. Mendoza, G. K. Wong, L. Li, and A. Tovar. *Trajectory Planning for Additive Manufacturing Based on Mechanical Performance*. IUPUI Research Day 2015, Indianapolis, IN, Apr 17, 2015.
76. Cardona-Serrano, C. and A. Tovar. *Design of Transmission Systems for Additive Manufacturing Demonstrated by the 3D Printing of a Harmonic Drive*. Indiana University Undergraduate Research Conference (IUURC 2014), Bloomington, IN, Nov 21-22, 2014.
77. Charlton, K. A., C. Kello, and A. Tovar. *Topology Optimization and 3D Printing of a Lightweight Protective Robotic Vehicle Structure*. IUPUI Research Day 2014, Indianapolis, IN, April 11, 2014.
78. Allen, T. and A. Tovar. *Design of Radio Communication Control System for Robotic Applications*. IUPUI Research Day 2014, Indianapolis, IN, April 11, 2014.
79. Reynolds, A, S. Mukhopadhyay, and A. Tovar. *Genetic Network Programming Learning Process Applied to Agent-Based Structural Design*. CRL poster presentations, Indianapolis, IN, July 26, 2013.
80. Angrick, Q., S. Mukhopadhyay, and A. Tovar. *Exploring Risk Analysis for Design of Multiscale Structures under Uncertain Design Hazards*. CRL poster presentations, Indianapolis, IN, July 26, 2013.

81. Wang, Y., S. Mukhopadhyay, and A. Tovar. *Sugarscape model for Agent-Based Structural Design*. CRL poster presentations, Indianapolis, IN, July 26, 2013.
82. Chow, K. H., S. Mukhopadhyay, and A. Tovar. *Exploring Genetic Algorithm for Numerical Optimization*. CRL poster presentations, Indianapolis, IN, July 26, 2013.
83. Liu, K., S. Shinde, A. Tovar. *Design of energy absorbing lightweight structures for improved vehicle crashworthiness*. Poster session, Joint Board of Advisors Meeting, Oct 25, 2013.

## **RESEARCH MENTORING AND ADVISING**

### PURDUE UNIVERSITY

#### **Ph.D. students**

1. Prathamesh Chaudhari (Jun 2021 – Present). Topic: Machine learning-assisted multi-fidelity optimization.
2. Aakash Gupta (Jan 2019 – Present). Topic: Topology optimization of dynamic multibody systems.

#### **M.S. students**

3. Mahdi Ghanati (Aug 2024 – Present). Topic: Compostability of thermoplastic starch plastics. Co-advisor: R. Rahimi (Material Science, Purdue).

#### **B.S. research assistants**

- Summer 2024: Two research assistants: Sevinch Pasilova (SURF), Gracie White (NSF-REU). (Total: 2 students).
- Fall 2024: Five research assistants: Sevinch Pasilova (OUR), Eittan Shaham (OUR), Joshua Renshaw (OUR), Andie Meyer (IUI), Gracie White (IUI). Four capstone design students: Tyler Weber, Ben Gaddis, Isaac Prosch, Patrick King. (Total: 9 students).

#### **Teachers**

- Summer 2024: Anthony Stanich (NSF-RET).

### INDIANA UNIVERSITY-PURDUE UNIVERSITY INDIANAPOLIS

#### **Ph.D. students**

4. Prathamesh Chaudhari (Jun 2021 – Present). Topic: Machine learning-assisted multi-fidelity optimization.
5. Aakash Gupta (Jan 2019 – Present). Topic: Topology optimization of dynamic multibody systems.
6. Joel Najmon (Aug 2018 – 2023). Topic: Machine learning-assisted multi-scale topology optimization and de-homogenization Co-advisor: Marisol Koslowski. Current affiliation: Naval Surface Warfare Center Crane Division, Crane, Indiana.
7. Homero Valladares (Aug 2017 – May 2023). Topic: Multi-objective and multi-fidelity Bayesian optimization. Co-advisor: Marisol Koslowski. Current affiliation: Research Scientist at Eli Lilly and Company, Indianapolis, Indiana.
8. Sajjad Raeisi. Design for crashworthiness (Aug 2015 – Aug 2021). Thesis: Design of multi-material structures for crashworthiness using hybrid cellular automata. Co-advisor: Jitesh Panchal. Current affiliation: Sr. Engineer - Multi-Disciplinary Optimization at Rivian, Irvine, California.
9. T.J. Segó (Aug 2016 – Aug 2019). Thesis: Hybrid Kinetic Monte Carlo Models of Cellular Processes in Interactive Dynamic Microenvironments. Co-advisor: Hector Gomez. Current affiliation: Assistant Professor, University of Florida, Gainesville, FL, USA.
10. Tong Wu (Aug 2015 – Jun 2019). Thesis: Topology optimization of multiscale structures coupling fluid, thermal, and mechanical analysis. Co-advisor: Jitesh Panchal. Current affiliation: Software engineer at Siemens PLM, Belgium.

11. Kai Liu (Aug 2014 – Jun 2018). Thesis: Cluster-based Structural Optimization and Applications to Crashworthiness. Co-advisor: Jitesh Panchal. Current affiliation: Software engineer at Google, Boston, USA.

### **M.S. thesis students**

1. Benjamin Coovert (Jan 2022 – Dec 2022) co-advised by Khosrow Nematollahi
2. Ashwin Gaonkar (Aug 2019 – Aug 2022) co-advised by Hazim El-Mounayri
3. Alen Anthony (Aug 2018 – Dec 2021): Design Engineer at Rivian, Irvine, CA
4. Shantanu Shinde (Aug 2017 – Jul 2019): PhD student at Temple University, Philadelphia, PA
5. Prathamesh Chaudhari (Jun 2014 – Jun 2019): Product Reliability Engineer, Siemens, Columbus, IN
6. Sai Ashish Kanna (Jun 2013 – Nov 2018): Control engineer at LHP Software
7. Joel Najmon (Jan 2017 – Dec 2017): See under Ph.D. students
8. Prasad Tapkir (Aug 2016 – Dec 2017): CAE Engineer at Ford Motor Co., Detroit, MI
9. Jennifer Solis Ocampo (Aug 2015 – Aug 2017): Test R&D Engineer at Intel Corporation
10. Homero Valladares (Aug 2015 – Aug 2017): See under Ph.D. students
11. T.J. Sego (Jun 2015 – Aug 2016): See under Ph.D. students
12. Fabian Lischke (Jan 2015 – Aug 2016): Senior R&D Engineer, Robert Bosch LLC, Germany
13. Vaibhav Gokhale (Jun 2014 – Aug 2016): Data Science Professional at Maharashtra, India
14. Parisa Ghane (Jun 2014 – Aug 2015, co-advised by L. Li): Ph.D. Student at Texas A&M University
15. Kunal Khadke (Nov 2011 – May 2015): CAE Engineer at General Motors
16. Anahita Emami (Aug 2012 – Aug 2014): PhD student at Virginia Tech
17. Satyajeet Shinde (Sep 2011 – May 2014): Design engineer at Ford Motor Company
18. Kai Liu (May 2012 – Aug 2013): See under Ph.D. students
19. Joshua Israel (Oct 2011 – May 2013): General Manager, SGS Columbus, Indiana

### **M.S. research assistants**

1. Megan Shamseddeen (Oct 2022 – Present)
2. Arpit Shah (Aug 2022 – Present)
3. Elizabeth West (Aug 2019 – Present)
4. Amir Abbas Yahyaieian (Aug 2020 – Aug 2022)
5. Miguel Araujo (Aug 2016 – May 2018)

### **Post-doctoral visiting scholars**

1. Alvaro Arias (Fall 2018, National University of Colombia)
2. Xuebin Fan (AY 2017-18, Northeast Electric Power University, China)
3. Yaghob Gholipour (AY 2017-18, University of Teheran, Iran)
4. Chi “Chris” Di (Aug 2015 – Aug 2016, Beijing University of Aeronautics and Astronautics, China)
5. Weigang An (Dec 2012 – Dec 2013, Northwestern Polytechnic University, China)

### **Ph.D. visiting students**

1. Edwin Prieto, National University of Colombia (Summer and Fall 2018)
2. Jaime Arcos Legarda, National University of Colombia (Fall 2012, AY 2017-18)

### **B.S. research assistants**

- IUPUI CRL Multidisciplinary Undergraduate Research Institute (MURI): **AY 2023-24** (6 students): Prerona Kaushik, Andie Meyer, Gracie White, Scott Lohman, Mayank Malhotra, Jake Staker. **AY 2022-23** (5 students): Jake Staker, Kourtney Collier, Eric Collier, Riya Singh, and Anum Ansar. **Summer 2022** (5 students): Jake Staker, Riya Singh, Jose Quintero, Zhen Hong, and Sydney Schott. **AY 2021-22** (7 students): Jake Staker, Riya Singh, Sarah Franklin, Ahmed Daood, Jose Quintero, and Gavin Anspach. **Summer 2021** (4 students): Regan Dwenger, Samuel Brumfield, Sidnee Zeiser, and Chelsea Uyeno. **AY 2020-21** (5 students): Kourtney Collier, Alexa Calonia, Emily Hine, Fadumo

- Warsame, Victoria Bozinovski. **Summer 2020** (4 students): Kourtney Collier, Samantha Goins, Austin Chirgwin, Isabelle Stanfield. **AY 2019-20** (6 students): Kaycee Hammond, Alexis Hecker, Ashlee Gibson, Kourtney Collier, Salvador Rodriguez, Sarah Smith. **Summer 2019** (5 students): Shelby Bowmer, Elexis Shields, Zain Akbar, Kate Edler, and Jason Smith. **AY 2018-19** (5 students): Rachael Benoy, Fatimah Alkadhim, Kerri Anne Charlton, Seth Kussow, Abole Diwate. **Summer 2018** (4 students): Megan Miller, Kaylee Crowell, Rachel Cadle, Pratik Rath, Matthew Joseph. **AY 2017-18** (4 students): Skye Tutino, Julian Strobel, Nicholas Lozier, Tanjimul Alam. **AY 2016-17** (2 students): Daniel Hauersperger, Vladzimir Kasacheuski. **Summer 2016** (4 students): Qiuyu “Autumn” Deng, Jinyun “Jason” Zhou, Vladzimir Kasacheuski, Laura Luther. **AY 2015-16** (4 students): Aaron Isaacs, Zongying “Ivy” Xu, Abigail Curdes, Carl Marko. **AY 2014-15** (8 students): Daniel Rodriguez Gambetta, Ali Mohammed Alkhaleefah, Aquil Faisal Janwari, Hikmet Duygu Ozdemir, Jomar Mendoza, Hamza Nawaz, Kenny Guan Kiak Wong, Raveena Maharu Patil. **Summer 2013** (4 students): Yumin Wang, Kok Hwang Chow, Zachary Paul Reynolds, Quinn Angrick.
- IUPUI IRIP First-Year Research Assistants: **AY 2023-24** (2 students): London Williams, Aidan Weiler.
  - Capstone Design in Mechanical Engineering: Spring 2024 (5 students): Ragib Dihan, Zech Irwin, Sai Nishith Reddy Kamalapally, Abdulrahman Owaidah, Noah Shook. **Fall 2023** (5 students): Dylan Suehrstedt, Adebiyi Adeleye, Ameen Kasem, Ivan Rodriguez, Rhys Davies. **Spring 2021** (3 groups, 18 students): Group J (6 students): Mohammad Mhod, Hiu Cheng, Brett Harvey, Brandon Lacy, Hani Salehi, Miguel Trejo; Group I (6 students): Danielle Trivett, Francis Iloeje, Nicole Rivera, Omar Ocelotl, Rakan Alzahrani, Sunday Folorunso; Group N (6 students): Sutton Evans, Bryce Kelly, Fabio Carpi, Evan Parker, Dalton Sholders, Justin Wagler. **Fall 2020** (4 students): Raja Daniel, Jesse Li, Karan Karthik. **Fall 2019** (5 students): Garrett Nogoda, Sara Matinmehr, Jonatan Gomez, Jon Bratton, Nathaniel Toney; **Spring 2019** (8 students): Nick Peskind, Megan Fraider, Grady Bennet, Gus Post, Tanner Cline, Matt Skoog, Thomas Bennett, Alec Schory; **Spring 2018** (5 students): Leanne Abel, Carolina Cardona, Samantha Mayer, Brandon Watson, Brett Ronczka; **Spring 2017** (5 students): Linlin Cai, Bryan Kirk, Casey Woods, Josh Brown, Omar El-Mounayri; **Spring 2016** (5 students): Kristin LaBounty, Richard Lindsay, Marko Saad, Kazuaki Tamura, Jacob Waugh; **Spring 2015** (4 students): Amanda Lund, Carl Marko, Tim Allen.
  - NSF Research Experience for Undergraduates (REU): **Summer 2023** (1 student): Theresa Mark (Wake Forest University). **Summer 2020** (3 students): Eric Raymond (IUPUI), Trevor Gordley (University of Illinois at Urbana-Champaign), Benjamin Thomas (Louisiana Sate University). **Summer 2019** (2 students): Aaron Scheiner (Rutgers) and Thomas Shomer (Valparaiso University). **Summer 2018** (3 students): Sarah Pugliese (Brown University), Sophia Kardadi (University of Notre Dame), John Rowe (Clemson University).
  - NEWM-N 420 Multimedia Project Development: **Fall 2020** (4 students): Ted Emery, Dakota Bennet, Colleen O’Brien, Abby Markel. **Spring 2020** (2 students): Kalene Kingery, Eric Ortiz.
  - Indiana STEM Louis Stokes Alliance for Minority Participation (IN LSAMP): **Summer 2020** (1 student): Elysa Thomson. **Summer 2019** (1 student): Salvador Rodriguez Valle.
  - School of Engineering & Technology Commitment to Engineering Excellence Research Fund: Kaycee Hammond (Summer 2019), Kate Edler (Spring 2019), Dante Goss (AY 2017-18), Carolina Cardona-Serrano (AY 2016-17), Jorge Ortiz (AY 2015-16), Anna Glumb (AY 2014-15), Ricardo Ortiz (AY 2014-15), Gillian Bundles (Summer 2015), Kerri Anne Charlton (Spring 2014), Amanda Justiniano (Fall 2013), Madeline Dement (Fall 2013), Sara Grimany (AY 2011-12).
  - IUPUI CRL Undergraduate Research Opportunities Program (UROP): AY 2021-22: Kourtney Collier. Spring 2014: Timothy Allen; Fall 2012: Adam El-Rahaiby.
  - IUPUI Freshman Honors Program: **Fall 2019** (3 students): Drew Fryman, Braden Havics, Michael Zajac. **Fall 2017** (1 student): Luke Baker, Honors. **Fall 2016** (2 students): Michael Johnson, Joel

Rasor. **Fall 2015** (1 student): Cullen Shorey. **Fall 2014** (3 students): Samantha Mayer, Zachary Wozniak, Braden Ratekin.

- Externally Funded Undergraduate Research Assistants: Tanjimul Alam, (AY 2015-16, AY 2016-17, AY 2017-18), Carl Marko (Fall 2016), Michael Klemen (Fall 2014), Eduardo Muller (Spring 2012).

### Teachers

- NSF Research Experience for Teachers (RET): Vanessa Gee, Eastwood Middle School, Indianapolis (Summer 2017, Summer 2018, Summer 2023).

### High school students

- Advanced Placement Program: Mia Sosa (Carmel High School, AY 2021-22). U.S. Army REAP grant: Lynn Ahrens, (Ursuline Academy, Summer 2017), Shaleese Jefferson (Decatur Central High School, Summer 2017), Brianna Hibbler (Rose-Hulman, Summer 2016), Shanlyn Jefferson (Decatur Central High School, Summer 2016), Makylah Wallace (Decatur Central High School, Summer 2016).

### Student recognitions

Under Prof. Tovar's mentoring, IUPUI student teams have received the following awards:

1. Gracie White, Bowling-Jones-Russo Memorial Undergraduate Research Award, 2024
2. Jake Staker, Ellyssa Purdy, Gracie White, Haiquan Guo, Jagadeep Thota, Amanda Siegel, Andres Tovar. Poster Presentation Award. IUURC, Jeffersonville, IN, Dec 8, 2023
3. Gracie White, Theresa E. Marks, Scott A. Lohman, Mayank Malhotra, Aidan Weileder, London Williams, Amanda P. Siegel, Andres Tovar. Poster Presentation Award. IUURC, Jeffersonville, IN, Dec 8, 2023
4. Scott Lohman, Mayank Malhotra, Gracie White, Theresa Marks, *Analyzing Effects of Calcium Chloride on Potato Starched Based Thermoplastics using a Box-Behnken Design of Experiments*, Mentors: Andres Tovar and Amanda P. Siegel, Outstanding Oral Presentation, IUPUI CRL Summer Research Symposium, Indianapolis, Indiana, Jul 28, 2023
5. Kourtney Collier, Top 100 IUPUI student, 2023
6. Kourtney Collier, Third place, ACS Undergraduate Poster Competition, Mar 2023
7. Austin Owens and Brendon Shelton, First Place Poster Winner, Eaton Corporation, Nov 2021
8. Kourtney Collier, Third place, Southeastern Additive Manufacturing Symposium, Apr 2021
9. Agricultural Robotics AgBOT Challenge 2019, Second Place, June 2019
10. Conexus Indiana Logistics and Automotive Case Competition, Third Place, Oct 2018
11. Agricultural Robotics AgBOT Challenge 2018, Second Place, May 2018
12. Agricultural Robotics AgBOT Challenge 2017, Fourth Place, May 2017
13. Agricultural Robotics AgBOT Challenge 2016, Fourth Place, May 2016
14. ROSAM Project Second Place Design Team Faculty Advisor, NAVSEA Crane Division, Apr 2012

## UNIVERSITY OF NOTRE DAME

### Ph.D. students

1. Punit Bandi (co-advisors: J.E. Renaud and J. Schmiedeler), Ph.D. in Mechanical Engineering, 2013: Current affiliation: Project Engineer at General Motors, Michigan, USA

### M.S. thesis students

2. Huade Tan (co-advisor: J.E. Renaud), M.S. Mechanical Engineering, 2010
3. Amanda PeGan, M.S., Engineering, Science, and Technology Entrepreneurship, 2010
4. Conor Riordan (co-advisor: J.E. Renaud), M.S. Mechanical Engineering, 2009

### B.S. research assistants

5. NSF Research Experience for Undergraduates (REU): David Bonitsky (ND, Summer 2011), Brendan McAuliffe (ND, Summer 2011), Christopher DiBernardo (ND, Summer 2011), Kathleen Murphy (ND, Summer 2011), Sarah McShane (ND, Summer 2011), Teresa Henisey (ND, Summer 2010), Kyle Kinnary (ND, Summer 2010), Jorge Alvarez (Autonomous University of San Luis Potosí, Mexico, Summer 2010), Jay Reddick (Morehouse College, Georgia, Summer 2010), Joshua Nosal (ND, Spring 2010), Dennis Malloy (ND, Summer 2009), Mike Penninger (Western Michigan University, Summer 2009)

## NATIONAL UNIVERSITY OF COLOMBIA

### **Ph.D. students**

1. Edwin Nikolai Prieto (as co-advisor, advisor: C.J. Cortés), Ph.D. in Mechanical Engineering, 2022. Software Developer, Mvnifest, Inc., Los Angeles, California.
2. Willington Jaime Arcos Legarda (co-advisor: J.A. Cortés), Ph.D. in Electrical Engineering, 2018. Assistant Professor, Dept of Mechatronic Eng, University of San Buenaventura, Colombia.
3. Luis Carlos Sarmiento Vela (co-advisor: C.J. Cortés), Ph.D. in Mechanical Engineering, 2016. Currently, Department Chair at the Pedagogic National University of Colombia.

### **M.S. thesis students**

4. Willington Jaime Arcos Legarda (co-advisor: H. Díaz), M.S. Industrial Automation, 2013
5. María Fernanda Espitia Moreno (co-advisor: C.J. Cortés), M.S. Biomedical Engineering, 2012
6. Andrés Julián Arias Moreno (co-advisor: D.A. Garzón), M.S. Biomedical Engineering, 2011
7. Germán Andrés Méndez Algarra, M.S. Mechanical Engineering, 2009
8. Wilson Isaac Quevedo Trujillo, M.S. Industrial Automation, 2008
9. Andrea Stella Vera Velandia, M.S. Mechanical Engineering, 2008
10. Heriberto Augusto Pinto Linares (co-advisor: by F. Angulo), M.S. Industrial Automation, 2007
11. Luis Carlos Sarmiento Vela, M.S. Industrial Automation, 2007
12. Fernando José Rodríguez Mesa, M.S. Industrial Automation, 2007
13. Oscar Rodrigo López Vaca, M.S. Materials and Manufacturing, 2006
14. Carlos Alberto Narváez Tovar (co-advisor: D.A. Garzón), M.S. Materials and Manufacturing, 2006

### **B.S. thesis students**

15. Roland Fernando Galvis Forero, B.S. Mechanical Engineering, 2007
16. Juan Camilo González Bautista, B.S. Mechanical Engineering, 2006
17. Rosana Bolivar, B.S. Mechanical Engineering, 2005
18. Andrés Julián Arias Moreno, B.S. Mechanical Engineering, 2005
19. Andrea Stella Vera Velandia, B.S. Mechanical Engineering, 2005
20. Henry Octavio Cortés Ramos, B.S. Mechanical Engineering, 2005
21. Carlos Augusto Diaz Castillo (co-advisor: M. Zatarain, Tekniker, Spain), B.S. Mechanical Eng., 2000
22. John Henry Gonzales Arévalo, B.S. Mechanical Engineering, 1999

## **UNIVERSITY SERVICE**

### PURDUE UNIVERSITY

- Motorsports Engineering, faculty search committee (Sep 2024)
- Promotion and tenure guidelines committee (Fall 2024)
- Motorsports Engineering, faculty search committee (Aug 2024)
- Mechanical Engineering, faculty search committee (Aug 2024)



## INDIANA UNIVERSITY-PURDUE UNIVERSITY INDIANAPOLIS

### **Campus Level**

- Member of the Evaluation Committee of Dean Russomanno (Fall 2021 – Spring 2022)
- APLU Diversity Task Force Faculty Member (Summer 2018 – 2020)

### **Purdue School of Engineering and Technology**

- Faculty Advisor, SHPE IUPUI Chapter (2011 – Present)
- Faculty Advisor, Robotics Club at IUPUI (Aug 2012 – Aug 2020)
- Nominations Committee Chair (Aug 2020 – Aug 2022)
- Faculty Search Committee for Technology Leadership and Communication (Spring 2020)
- Faculty Senate Member (Aug 2018 – Aug 2020, Aug 2021 – Aug 2022)
- Grievance Board Chair (Aug 2018 – Aug 2019)
- Diversity Task Force Committee (Aug 2017 – Aug 2019 – Aug 2020)
- Accelerate Innovation Task Force Committee (Aug 2017 – Aug 2019)
- Diversity Recruitment and Retention Committee, Faculty Member (Aug 2016 – Aug 2020)
- Faculty Search Committee for Motorsports Engineering (Jan 2017 – Aug 2017)
- IUPUI Co-coordinator for the AgBOT Challenge (Aug 2017 – Aug 2020)
- IUPUI Coordinator for the AgBOT Challenge (Aug 2015 – Aug 2017)
- NSF Proposal Preparation Group Coordinator, Purdue School of Engr. and Tech. (2013 – 2016)
- IUPUI Coordinator for the 2012 NAVSEA Crane Undergraduate Design Contest, Spring 2012

### **Department of Mechanical Engineering**

- Graduate Education Committee Member (Aug 2018 – May 2022)
- Faculty Search Committee (Jan 2018 – Aug 2018)
- Faculty Search Committee (Jan 2017 – Aug 2017)
- Faculty Search Committee (Aug 2015 – May 2016)
- Graduate Education and Research Committee Member (Aug 2013 – Aug 2018)
- ME Design Focus Group Faculty Member (Aug 2012 – Present)
- ME Course Coordinator in mechanics, design, and numerical methods (Aug 2011 – Present)
- Chair of the ME Research Seminar (Aug 2012 – Aug 2013)
- Co-Chair of the ME Research Seminar (Aug 2011 – Aug 2012)
- Director of the Engineering Design Research Laboratory (Aug 2011 – Present)
- Director of the Additive Manufacturing Laboratory (Aug 2015 – Present)
- Director of the Center for Additive Manufacturing Research at IUPUI (Aug 2016 – Present)

### **Graduate Committee Membership**

- MS student Oluwaseun Omole, IUPUI, Advisor: Mangilal Agarwal (Summer 2023)
- MS student Ashwin Gaonkar, IUPUI, Advisor: Hazim El-Mounayri (Spring 2022)
- MS student Charles Rumberger, IUPUI, Advisor: Julie Ji (Fall 2022)
- MS student Tayabali Kesuri, IUPUI, Advisor, Sohel Anwar (Fall 2022)
- PhD student Xi Chen, Purdue, Advisor: Carlo Larriba (Spring 2022)
- PhD student Reza Moheimani, Purdue, Advisor: Hamid Dalir (Spring 2022)
- PhD student Ehsan Maleki, Purdue, Advisor: Hazim El-Mounayri (Fall 2021)
- PhD student Adam Foltz, Purdue, Advisor: Hazim El-Mounayri (Fall 2021)
- MS student Vidya Balu Wable, IUPUI, Advisor: Hamid Dalir (Fall 2021)
- MS student Pradnya Zende, IUPUI, Advisor: Hamid Dalir (Fall 2021)
- MS student Tamara Al-Muhtaseb, IUPUI, Advisor: Julie Ji (Fall 2021)

- MS student Harsh Saksena, IUPUI, Advisor: Sohel Anwar (Summer 2021)
- MS student Vidya Wable, IUPUI, Advisor: Hamid Dalir (Spring 2021)
- MS student Omkar Parkar, IUPUI, Advisor: Sohel Anwar (Spring 2021)
- MS student Harshal Dhamade, IUPUI, Advisor: Jing Zhang (Spring 2021)
- PhD student Dennis Leon, National Univ. of Colombia, Advisor: Nelson Arzola (Summer 2020)
- MS student Pedro Rubio, National Univ. of Colombia, Advisor: Alexander Gomez (Summer 2020)
- MS student Tajesh Dube, IUPUI, Advisor: Jing Zhang (Spring 2020)
- MS student Sanskar Thakur, IUPUI, Advisor: Mangilal Agarwal (Spring 2020)
- MS student Salah Hassan, IUPUI, Advisor: Sohel Anwar (Fall 2019)
- MS student Meghana Kamble, IUPUI, Advisor: Hamid Dalir (Summer 2019)
- MS student Riddhi Joshi, IUPUI, Advisor: Hazim El-Mounayri (Spring 2019)
- MS student Anudeep Padmanabhan, IUPUI, Advisor: Jing Zhang (Spring 2019)
- MS student Mallikharjun Marrey, IUPUI, Advisor: Hazim El-Mounayri (Spring 2019)
- MS student Archit Deshpande, IUPUI, Advisor: Hamid Dalir (Spring 2019)
- PhD student Sheng Yang, McGill University, Advisor: Fiona Zhao (Fall 2018)
- MS student Tianyang Wu, IUPUI, Advisor: Carlos Larriba (Fall 2018)
- MS student Shitiz Vij, IUPUI, Advisor: Mangilal Agarwal (Fall 2018)
- MS student Aaron Berndt, IUPUI, Advisor: Jong Ryu (Summer 2018)
- MS student Sugrim Sagar, IUPUI, Advisor: Jing Zhang (Spring 2018)
- MS student Nishant Hawaldar, IUPUI, Advisor: Jing Zhang (Spring 2018)
- MS student Eduardo Salcedo, IUPUI, Advisor: Jong Ryu (Fall 2017)
- PhD student Guodong Zhang, Notre Dame, Advisor: Kapil Khandelwal (Fall 2017)
- MS student Samuel Attoye, IUPUI, Advisor: H. El-Mounayri (Fall 2017)
- PhD student Christian Silva, Nat Univ of Colombia, Advisor: C.J. Cortes (Fall 2017)
- MS student Praveen Kumar, IUPUI, Advisor: H. El-Mounayri (Spring 2017)
- PhD student Jennifer Corredor, Nat Univ of Colombia, Advisor: C.J. Cortes (Spring 2017)
- PhD student Edwin Prieto, Nat Univ of Colombia, Advisor: C.J. Cortes (Fall 2016)
- MS student Deepak Tangirala, Purdue University, Advisors: J. Chen, A. Razban (Fall 2016)
- PhD student Junho Chun, UIUC, Advisor: G. Paulino (Summer 2016)
- MS student Suchana Akter Jahan, Advisor: H. El-Mounayri (Summer 2016)
- MS student Ayan Roy, Purdue University, Advisor: Tamer Wasfy (Spring 2016)
- MS student Jersson Leon, Nat U of Colombia, Advisor: M.A. Guzman (Fall 2015)
- MS student Cagkan Yildiz, Purdue University, Advisor: Tamer Wasfy (Spring 2015)
- PhD student Helbert Espitia, Nat U of Colombia, Advisor: J Sofrony (Spring 2014)
- MS student Yi Zhang, Purdue University, Advisor: Jing Zhang (Summer 2014)
- MS student Ragibul Huq, Purdue University, Advisor: Sohel Anwar (Spring 2014)
- PhD student Qi Liu, Purdue University, Advisor: Jian Xie (Spring 2014)
- PhD student (c) Junho Chun, UIUC, Advisor: G. Paulino (Spring 2013)
- PhD student John Goetz, Notre Dame, Advisor: K. Matous (Spring 2013)

## UNIVERSITY OF NOTRE DAME

### **Fitzpatrick College of Engineering**

- Co-director of the Design Automation Laboratory, August 2008 – August 2011
- Graduate School Recruiter, Tau Beta Pi 2008 Annual Convention, Sacramento, California (Oct 2008)

### **Graduate Committee Membership**

- PhD student Punit Bandi, 2011
- PhD student John Goetz, 2011
- PhD student Chandan Mozumder, 2011
- PhD student Gilberto Mejía, 2010
- MS student Devendra Dubey, 2009
- MS student Vikas Samvedi, 2009
- PhD student Mary Wagner Fuhs (Psychology), 2008
- PhD student Matthew Meixner (Physics), 2009
- PhD student Daniel S. Alessi (Geological Sciences), 2010

## NATIONAL UNIVERSITY OF COLOMBIA

### **National University of Colombia, Bogotá campus**

- University Academic Provost, Bogotá Campus (Jun 2007 – Aug 2008). The holder of this high-level administrative position is charged with proposing and implementing university policies to ensure the academic quality of 49 undergraduate programs and 220 graduate programs in 11 colleges and 7 research institutes at the largest campus of the National University of Colombia. Ex-officio committees include: Accreditation Committee, Industry Liaisons Committee, Foreign Language Committee, University's K-12 Committee, Council of College Associate Deans, Council of Research Institute Directors, Academic Vice-President's Advisory Committee, and Bogotá Campus General Council.
- University Vice-President (interim) of the National University of Colombia, Bogotá Campus (Dec 2007 – Jan 2008). During this winter break period I was also the director in charge of the Division of Extension (Industry Liaisons), four Research Institutes, and the University's Press.

### **College of Engineering**

- Coordinator of the design of the questionnaire for professional examinations in Mechanical Engineering for the Colombian Institute for the Development of Post-Secondary Education – *Instituto Colombiano para el Fomento de la Educación Superior*, ICFES (Nov 2006 – Feb 2007)
- Faculty Delegate to the Committee of the Graduate Program in Industrial Automation, Department of Electrical and Electronic Engineering (Aug 2004 – May 2007)
- Director of the Office of Assistance and Contracts with the Industry for the College of Engineering (Sep 2000 – Aug 2001)

### **Department of Mechanical and Mechatronic Engineering**

- Department Chairman (Apr 2005 – Jan 2007). This is the highest administrative position at the department level. Ex-officio committees include: Undergraduate (Mechanical and Mechatronic Engineering) and Graduate (M.S. in Materials and Manufacturing) Studies Committees, Committee on Appointments and Promotions, and Engineering College Council. During this period I was one of the main proponents of the Master's Program in Mechanical Engineering and the Master's Program in Biomedical Engineering. Both were approved in Spring 2006 and offered in Spring 2007.
- Chair of three Shows of Machines and Prototypes for ME students (1998, 2000, 2001)
- Faculty advisor for the Go-kart Club (2000 – 2011)

### **Graduate Committee Membership**

- Committee Member to PhD student Dennis León (Mechanical Engineering, Candidacy Fall 2015)
- Committee Member to PhD student Andrés Eleazar Jaramillo Velásquez (Industrial Automation, Candidacy Fall 2006, and Dissertation Fall 2012)
- Committee Member to MS student Jennifer Paola Corredor Gómez (Mechanical Eng., Fall 2011)

- Committee Member to MS student Claudia Garzón (Industrial Automation, Spring 2005)

## **PROFESSIONAL SERVICE**

### TECHNICAL PROGRAMS AND CONFERENCES

1. Symposium Co-organizer, Review Coordinator, ASME 50th Design Automation Conference, Design of Engineering Materials and Structures Session, Washington, DC, Aug 25-28, 2024.
2. Symposium Co-organizer, Review Coordinator, SS100 Body Engineering and Design and SS103 Design Optimization – Methods and Applications, 2023 SAE WCX, Detroit, MI, Apr 16-18, 2024.
3. Conference Co-organizer, Inaugural Indianapolis Motorsports Conference (IMC), Indianapolis, IN, Dec 6, 2023.
4. Symposium Co-organizer, Review Coordinator, ASME 49th Design Automation Conference, Design of Engineering Materials and Structures Session, Boston, MA, Aug 20-23, 2023.
5. Symposium Co-organizer, Review Coordinator, ASME 48th Design Automation Conference, Design of Engineering Materials and Structures Session, St. Louis, MO, Aug 14-17, 2022.
6. Symposium Co-organizer, Review Coordinator, ASME 46th Design Automation Conference, Design for Additive Manufacturing Session, Virtual, Aug 16-19, 2020.
7. Symposium Co-organizer, Review Coordinator, ASME 46th Design Automation Conference, Design of Engineering Materials and Structures Session, Virtual, Aug 16-19, 2020.
8. Symposium Co-organizer, Review Coordinator, ASME 45th Design Automation Conference, Design for Additive Manufacturing Session and Design of Engineering Materials and Structures Session, Anaheim, CA, Aug 18-21, 2019.
9. Symposium Co-organizer, Review Coordinator, ASME 44th Design Automation Conference, Design for Additive Manufacturing Session and Design of Engineering Materials and Structures Session, Quebec City, Canada, Aug 26-29, 2018.
10. Symposium Co-organizer, Review Coordinator, ASME 43th Design Automation Conference, Design of Engineering Materials and Structures Session, Cleveland, Ohio, Aug 6-9, 2017.
11. International Scientific Committee Member of the ISSMO 4th International Conference on Engineering Optimization (EngOpt 2016), Iguassu Falls, Brazil, June 19-23, 2016.
12. Symposium Co-organizer, Review Coordinator, ASME 42th Design Automation Conference, Design of Engineering Materials and Structures Session, Charlotte, North Carolina, Aug 21-24, 2016.
13. Symposium Co-organizer, Review Coordinator, ASME 41th Design Automation Conference, Design of Engineering Materials and Structures Session, Boston, Massachusetts, August 2-5, 2015.
14. International Scientific Committee Member of the ISSMO 4th International Conference on Engineering Optimization (EngOpt 2014), Lisbon, Portugal, September 8-11, 2014.
15. Symposium Co-organizer, Review Coordinator, ASME 40th Design Automation Conference, Design of Engineering Materials and Structures Session, Buffalo, New York, August 17-20, 2014.
16. Symposium Co-organizer, Review Coordinator, ASME 39th Design Automation Conference, Design of Engineering Materials and Structures Session, Portland, Oregon, August 4-7, 2013.
17. Scientific Committee Member of the 6th International Conference on Mechanical Engineering and 4th on Mechatronic Engineering (CIMM 2013). Barranquilla, Colombia. May 2-4, 2013.
18. International Participants Chair of the 2012 ASME International Design Engineering Technical Conferences (IDETC 2012), Chicago, Illinois, August 12-15, 2012.
19. Organizer of the Special Session In Memory of Prof. John E. Renaud and Review Coordinator for the ASME 38th Design Automation Conference, Chicago, Illinois, August 14, 2012.
20. Local Organizing Committee Member and Symposium Organizer In Memory of Prof. John E. Renaud, Joint EMI Conference and ASCE 11th Joint Specialty Conference on Probabilistic Mechanics and Structural Reliability (EMI/PMC 2012), Notre Dame, Indiana, June 17-20, 2012.

21. International Scientific Committee Member of the 2nd International Conference on Engineering Optimization (EngOpt 2010), Lisbon, Portugal, September 6-9, 2010.
22. International Scientific Committee Member of the 1st International Conference on Engineering Optimization (EngOpt 2008), Rio de Janeiro, Brazil, June 2-5, 2008.
23. International Committee Member of the 23rd ISPE International Conference on CAD/CAM, Robotics and Factories of the Future (CARS&FOF 2007). Bogotá, Colombia. August 16-18, 2007.
24. **General Conference Chair** of the 3rd International Conference on Mechanical Engineering and 1st on Mechatronic Engineering (CIMM 2006). Bogotá, Colombia. September 20-22, 2006.
25. **General Conference Vice-Chair**. Binational Conference on Industrial and Mechanical Engineering, Venezuela–Colombia. Mérida, Venezuela. May 18-20, 2006.
26. International Committee Member. International Conference on Bond Graph Modeling and Simulation (ICBGM 1999), San Francisco, California, January 17-22, 1999.
27. Board Member of the National Commission for Maintenance, Colombian Association of Mechanical, Electrical and related Engineers (ACIEM), Colombia, 1998.

#### EDITORIAL MEMBERSHIP

- Guest Associate Editor. ASME Journal of Mechanical Design. Aug 2017 – Dec 2018
- Editorial Board Member. Journal Cuarzo. Since 2017
- Elsevier Innovation Panel Member. Since Aug 2015
- Editorial Board Member. Austin Journal of Robotics & Automation. Since May 2014
- Editorial Board Member. Journal of Surfaces and Interfaces of Materials. Since Aug 2011
- Editorial Board Member. Journal Intekhnia, Saint Thomas Aquinas University. Since Jun 2010

#### PROFESSIONAL ORGANIZATIONS

- SADCO Indiana, Board Member (since Jan 2024)
- SHPE Indiana, Education & Student Relationships Chair (since Jan 2017)
- American Society of Mechanical Engineering (ASME member # 8100596 since 2003)
- Society of Automotive Engineers (SAE member # 6135603884 from 2010 to 2024, # 6159581924 since 2024)
- International Society for Structural and Multidisciplinary Optimization (ISSMO member since 2004)
- America Makes Design Swimlane Working Group Member (from 2016 to 2018)
- American Institute of Aeronautics and Astronautics (AIAA member # 241479 from 2004 to 2014)
- Society of Hispanic and Professional Engineers (SHPE member # 65558 since 2013)
- American Society for Engineering Education (ASEE member from 2013 to 2017)
- Biomechanics and Biomaterials Research Center at IUPUI (core member from 2012 to 2024)
- Richard G. Lugar Center for Renewable Energy at IUPUI (research member from 2013 to 2024)
- Center for Additive Manufacturing Research at IUPUI (CAMRI) (director from 2016 to 2024)

#### JOURNAL PAPER REVIEWS

Prof. Tovar has served as reviewer of hundreds of journal papers (~10 papers per year) submitted to scientific journals including: ASME Journal of Mechanical Design, Structural and Multidisciplinary Optimization, Engineering Structures, Additive Manufacturing, Materials and Design, Mathematical Biosciences, Applied Mathematical Modeling, Journal of Computing and Information Science in Engineering, Biomechanics and Modeling in Mechanobiology, Journal of Mechanical Engineering Research, PLoS ONE Journal, Symmetry, Journal of Aerospace Engineering, AIAA Journal, Mathematical Problems in Engineering, Journal of Computational Physics, Mechanics Research

Communications, Physica A, Thin-Walled Structure, and International Journal of Vehicle Design, among others.

#### CONFERENCE PAPER REVIEWS

Prof. Tovar has served as reviewer for several conferences including: ASME International Design Engineering Technical Conference IDETC (since 2007), SAE World Congress (since 2015), among others.

#### GRANT PROPOSAL AND SCHOLAR REVIEWS

Prof. Tovar has served as grant proposal reviewer for several organizations including National Science Foundation CMMI (2013, 2014, 2016, 2018, 2021, 2022), The Fulbright Commission (2006, 2007, 2012, 2013), Air Force Summer Faculty Fellowship (2014), Colciencias (2006, 2007, 2008, 2010, 2012, 2013), Delft University of Technology (2016), IUPUI (since 2011), among others.

#### BOOKS AND BOOK PROPOSAL REVIEWS

Prof. Tovar has served as reviewer of book proposal for Elsevier (2017), Wiley (2017), and CRC Press (2014).

#### MENTORING, COACHING, AND ADVISING

- Anderson Community School Corporation STEM Advisory Board Member, Spring 2024
- Mentor, Future GRADS MentorSHPE Program, Fall 2023, Spring 2024
- Coach, Math Pentathlon, College Wood Elementary School, Carmel, IN, Fall 2022
- Coach, VEX Robotics, Our Lady of Mount Carmel Elementary School, Carmel, IN, Fall 2019
- Research mentor, SWE summer camp for high school students, IUPUI, Summer 2019
- Coach, Robotics and additive manufacturing, MEAP summer camp, IUPUI, Summer 2019
- Research mentor, SWE summer camp for high school students, IUPUI, Summer 2018
- Coach, Robotics and additive manufacturing, MEAP summer camp, IUPUI, Summer 2018
- Research mentor, SWE summer camp for high school students, IUPUI, Summer 2017
- Coach, Robotics and additive manufacturing, MEAP summer camp, IUPUI, Summer 2017
- Coach, Robotics and additive manufacturing, MEAP summer camp, IUPUI, Summer 2016

## PUBLICATIONS

Andres Tovar

### JOURNAL PAPERS

(63 journal papers published)

**2024** (3 papers published, 2 papers under review)

1. White, G.M., A.P. Siegel, and **A. Tovar**. *Optimizing Thermoplastic Starch Film with Heteroscedastic Gaussian Processes in a Bayesian Experimental Design Framework*. Materials, Special Issue: Modelling, Simulation and Optimisation of Non-typical and Innovative Materials, Vol.: 14, Issue: 21, Pages: 5345 (19 pages), <https://doi.org/10.3390/ma17215345>.
2. Jake Staker, Sydney Schott, Riya Singh, Kourtney Collier, Gregory Druschel, Amanda Siegel, and **Andres Tovar**. *Influence of Choline Chloride/Urea and Glycerol Plasticizers on the Mechanical Properties of Thermoplastic Starch Plastics*. Polymers, Special Issue: Biomaterials and Biobased Polymers, Vol.: 16, Issue: 6:751, 11 Pages, 2024, <https://doi.org/10.3390/polym16060751>
3. Najmon, J. and **A. Tovar**. *Evaluation of Neural Network-based Derivatives for Topology Optimization*. Journal of Mechanical Design, 2024, Vol.: 146, Issue: 7:071704 (13 pages), 2024 <https://doi.org/10.1115/1.4064243>
4. Staker, J., G.M. White, D.A. Scheiman, A.P. Siegel, **A. Tovar**, and H. Guo. *Evaluation of Ethanol Solvent Exchange Processes for Potato Starch Aerogel Insulation*. ACS Sustainable Chemistry & Engineering. Under review.
5. Joel Najmon, and **Andres Tovar**. *Multiscale Topology Optimization via Artificial Neural Networks and Parametric Topology-optimized Microstructures*. Computers and Structures. Under review.

**2023** (2 papers published)

6. Prieto, E.N., **A. Tovar**. C.J. Cortes. *Passive Dynamic System for Energy Returning on Transtibial Prosthesis*. Medical Engineering and Physics, Vol.: 120, Issue: 104053, 2023, <https://doi.org/10.1016/j.medengphy.2023.104053>
7. Valladares, H. and **A. Tovar**. *Multi-objective Bayesian Optimization Supported by an Expected Pareto Distance Change*. Journal of Mechanical Design, Vol.: 145, Issue: 10:101705 (13 pages), 2023, <https://doi.org/10.1115/1.4062789>

**2022** (4 papers)

8. Valladares, H. and **A. Tovar**. *Nonlinear Multi-Fidelity Bayesian Optimization: An Application in the Design of Blast Mitigating Structures*. SAE International Journal of Advances and Current Practices in Mobility, Vol.: 4, Issue: 6, Pages: 2248-2260, 2022, <https://doi.org/10.4271/2022-01-0790>.
9. Gaonkar, A., H. Valladares, **A. Tovar**, L. Zhu, and H. El-Mounayri. *Multi-objective Bayesian optimization of lithium-ion battery cells for electric vehicle operational scenarios*. Journal of Electronic Materials. Vol.: 3, Issue: 2, Pages: 201-217, 2022, <https://doi.org/10.3390/electronicmat3020017>.
10. Valladares, H., T. Li, L. Zhu, H. El-Mounayri, A. Hashem, A. Abdel-Ghany, and **A. Tovar**. *Gaussian Process-based Prognostics of Lithium-ion Batteries and Design Optimization of Cathode Active Materials*. Journal of Power Sources. Vol.: 528, Page: 231026, 2022, <https://doi.org/10.1016/j.jpowsour.2022.231026>.
11. Hua Wang, Ahmed M Hashem, Ashraf E Abdel-Ghany, Somia M Abbas, Rasha S El-Tawil, Tianyi Li, Xintong Li, Hazim El-Mounayri, **Andres Tovar**, Likun Zhu, Alain Mauger, Christian M Julien. *Effect of cationic (Na<sup>+</sup>) and anionic (F<sup>-</sup>) co-doping on the structural and electrochemical properties of LiNi<sub>1/3</sub>Mn<sub>1/3</sub>Co<sub>1/3</sub>O<sub>2</sub> cathode material for lithium-ion batteries*. International Journal of Molecular Sciences. Special Issue “Advanced Materials for Electrochemical Energy Storage:

Lithium-Ion, Lithium-Sulfur, Lithium-Air and Sodium Batteries”. Vol.: 23, Issue: 12, Pages: 6755 (22 pages), 2022, <https://doi.org/10.3390/ijms23126755>.

#### 2021 (6 papers)

12. Hua Wang, Tianyi Li, Ahmed M. Hashem, Ashraf E. Abdel-Ghany, Rasha S. El-Tawil, Hanaa M. Abuzeid, Amanda Coughlin, Kai Chang, Shixiong Zhang, Hazim El-Mounayri, **Andres Tovar**, Likun Zhu, and Christian M. Julien. *Nanostructured Molybdenum-Oxide Anodes for Lithium-Ion Batteries: An Outstanding Increase in Capacity*. *Nanomaterials*. Vol.: 11, Issue: 12, Pages: 13. <https://doi.org/10.3390/nano12010013>, 2021.
13. Najmon, J.C., T. Wu, and **A. Tovar**. *Implementation of Thermomechanical Multiphysics in a Large-Scale Three-dimensional Topology Optimization Code*. *SAE International Journal of Advances and Current Practices in Mobility*, Vol.: 3, Issue: 6, Pages: 2972-2984, doi:10.4271/2021-01-0844, 2021.
14. Valladares, H, **A. Tovar**. *Multilevel Design of Sandwich Composite Armors for Blast Mitigation using Bayesian Optimization and Non-Uniform Rational B-Splines*. *SAE International Journal of Advances and Current Practices in Mobility*. Vol.: 3, Issue: 4, Pages: 2146-2158, <https://doi.org/10.4271/2021-01-0255>, 2021.
15. Arcos-Legarda, J. and **A. Tovar**. *Mechatronic Design and Active Disturbance Rejection Control of a Bag Valve-based Mechanical Ventilator for COVID-19 Treatment*. *ASME Journal of Medical Devices*. Vol.: 15, Issue: 3, Pages: 031006 (8 pages), <https://doi.org/10.1115/1.4051064>, 2021.
16. An, W., X. Han, **A. Tovar**, and S. Wang. *Targeting the acceleration-time response of vehicle structures under crash impact using equivalent dynamic loads*. *Structural and Multidisciplinary Optimization*. Vol.: 64, Issue: 2, Pages: 599-612, <https://doi.org/10.1007/s00158-021-02845-y>, 2021.
17. Tianyi Li, Kai Chang, Ahmed M. Hashem, Ashraf E. Abdel-Ghany, Rasha S. El-Tawil, Hua Wang, Yaroslav Losovyj, Hazim El-Mounayri, **Andres Tovar**, Likun Zhu, Christian M. Julien. *Long-term cycling stability of Ni-rich spinel cathode for high-voltage Li-ion batteries*. *Electrochem*. <https://doi.org/10.3390/electrochem2010009>, 2021

#### 2020 (3 papers)

18. Sego, T.J.; M. Prideaux, B. McCarthy, P. Li, L. Bonewald, B. Ekser, **A. Tovar**, Smith, L., *Computational Fluid Dynamic Analysis of Bioprinted Self-Supporting Perfused (SSuPer) Tissue Models*. *Biotechnology and Bioengineering*, Vol.: 117, Issue: 3, Pages: 798-815, <https://doi.org/10.1002/bit.27238>, 2020.
19. Sego, T.J., Y-T. Hsu, T-M. G. Chu, **A. Tovar**. *Modeling Progressive Damage Accumulation in Bone Remodeling Explains the Thermodynamic Basis of Bone Resorption by Overloading*. *Bulletin of Mathematical Biology*. Vol.: 82, Issue: 134, <https://doi.org/10.1007/s11538-020-00808-w>, 2020.
20. Sego, T.J., James A. Glazier, **A. Tovar**. *Unification of Aggregate Growth Models by Emergence from Cellular and Intracellular Mechanisms*. *Royal Society Open Science*. Vol.: 7, Issue: 192148, <https://doi.org/10.1098/rsos.192148>, 2020.

#### 2019 (6 papers)

21. Liu, K, T. Wu, D. Detwiler, J. Panchal, **A. Tovar**. *Design for crashworthiness of categorical multimaterial structures using cluster analysis and Bayesian optimization*. *ASME Journal of Mechanical Design*, Special issue on Machine Learning, Vol.: 141, Issue: 12, Pages: 121701 (15 pages), <https://doi.org/10.1115/1.4044838>, 2019.
22. Wu, T. and **A. Tovar**. *Multiscale, thermomechanical topology optimization of self-supporting cellular structures for porous injection molds*. *Rapid Prototyping Journal*, Vol. 25, Issue 9, Pages: 1482-1492, <https://doi.org/10.1108/RPJ-09-2017-0190>, 2019.
23. Raeisi, S, J. Kadkhodapour, and **A. Tovar**. *Mechanical properties and energy absorbing capabilities of Z-pinned aluminum foam sandwich*. *Journal of Sandwich Structures and Materials*, Vol.: 214, Pages: 34-46, <https://doi.org/10.1016/j.compstruct.2019.01.095>, 2019.



24. Han, X., W. An, **A. Tovar**. *Targeting the Force-Displacement Response of Thin-walled Structures Subjected to Crushing Load using Curve Decomposition and Topometry Optimization*. Structural and Multidisciplinary Optimization, Vol.: 59, Issue: 6, Pages: 2303-2318, <https://doi.org/10.1007/s00158-019-02197-8>, 2019.
25. Arcos-Legarda, J., J.A. Cortes, **A. Tovar**. *Robust Compound Control of Dynamic Bipedal Robots*. Mechatronics, Vol. 59, Pages 154-167, 2019, <https://doi.org/10.1016/j.mechatronics.2019.04.002>.
26. Arcos-Legarda, J., J.A. Cortes, A. Beltran-Pulido, **A. Tovar**. *Hybrid disturbance rejection control of dynamic bipedal robots*. Multibody System Dynamics, Vol.: 46, Issue: 3, Pages: 281-306, <https://doi.org/10.1007/s11044-019-09667-3>, 2019.

**2018** (2 papers)

27. Najmon, J., DeHart, J., Wood, Z., and **A. Tovar**., *Development of a Helmet Liner through Bio-Inspired Structures and Topology Optimized Compliant Mechanism Arrays*, SAE International Journal of Transportation Safety 6(3), <https://doi.org/10.4271/2018-01-1057>, 2018.
28. Liu, K., D. Detwiler, **A. Tovar**. *Cluster-based optimization of cellular materials and structures for crashworthiness*. ASME Journal of Mechanical Design, special issue on Special Issue on Design of Engineered Materials and Structures, Vol. 140, Issue 11, Pages: 111412 (10 pages), <https://doi.org/10.1115/1.4040960>, 2018.

**2017** (4 papers)

29. Segó, T.J., U. Kasacheuski, D. Hauerperger, **A. Tovar**, N.I. Moldovan. *A Heuristic Computational Model of Basic Cellular Processes and Oxygenation during Spheroid-Dependent Biofabrication*. Biofabrication, Vol. 9, Issue 2, Pages 024104, 2017.
30. Liu, K., D. Detwiler, **A. Tovar**. *Optimal Design of Nonlinear Multimaterial Structures for Crashworthiness using Cluster Analysis*. ASME Journal of Mechanical Design, Vol. 139, Issue 10, Pages 101401 (11 pages), doi: 10.1115/1.4037620, 2017.
31. Wu, T., K. Liu, **A. Tovar**. *Multiphase Topology Optimization of Lattice Injection Molds*. Computers & Structures, Vol. 192, Pages 71-82, <https://doi.org/10.1016/j.compstruc.2017.07.007>, 2017.
32. Jahan, S. A., T. Wu, Y. Zhang, J. Zhang, **A. Tovar**, H. El-Mounayri. *Thermo-mechanical design optimization of conformal cooling channels using design of experiments approach*. Procedia Manufacturing, Vol. 10, Pages 898-911, 2017.

**2016** (1 paper)

33. Jahan, S. A., T. Wu, Y. Zhang, H. El-Mounayri, **A. Tovar**, J. Zhang, D. Acheson, R. Nalim, X. Guo, W. H. Lee. *Implementation of Conformal Cooling and Topology Optimization in 3D Printed Stainless Steel Porous Structure Injection Molds*. Procedia Manufacturing, Vol. 5, Pages 901-9015, 2016

**2015** (3 papers)

34. Wu, T., S.A. Jahan, P. Kumar, **A. Tovar**, H. El-Mounayri, Y. Zhang, J. Zhang, D. Acheson, K. Brand, R. Nalim. *A framework for optimizing the design of injection molds with conformal cooling for additive manufacturing*. Procedia Manufacturing, Vol. 1, Pages: 404-415, doi:10.1016/j.promfg.2015.09.049, 2015
35. Bandi, P., D. Detwiler, J. Schmiedeler, and **A. Tovar**. *Design of Progressively Folding Thin-Walled Tubular Components Using Compliant Mechanism Synthesis*. Thin-Walled Structures, Vol. 37, Issue 2, Pages: 723-735, doi:10.1007/s40430-014-0197-0, 2015
36. León, D., N. Arzola, and **A. Tovar**. *Statistical analysis of the influence of tooth geometry in the performance of harmonic drive*. Journal of the Brazilian Society of Mechanical Sciences and Engineering. Vol. 37, Pages: 723-735, 2015, doi:10.1007/s40430-014-0197-0, 2015

**2014** (2 papers)

37. Liu, K. and **A. Tovar**. *An efficient 3D topology optimization code written in Matlab*. Structural and Multidisciplinary Optimization, Vol. 50, Issue 6, Pages: 117-1196, 2014, doi:10.1007/s00158-014-1107-x, 2014.
38. Lee, S. and **A. Tovar**. *Outrigger placement in tall buildings using topology optimization*. Engineering Structures. Vol. 74, Issue 1, Pages: 122-129, doi:10.1016/j.engstruct.2014.05.019, 2014.

### 2013 (7 papers)

39. Bandi, P., J. Schmiedeler, and **A. Tovar**. *Design of Crashworthy Structures with Controlled Energy Absorption in the HCA Framework*. ASME Journal of Mechanical Design, Vol. 135, Issue 9, Pages 091002.1-091002.11, 2013.
40. Uribe, B., L.M. Méndez, **A. Tovar**, J.P. Charalambos, O. Arcila, and A.D. López. *Mixed Reality Boundaries in Museum Preservation Areas*. International Journal of Art, Culture and Design Technologies, Vol. 3, Issue 2, Pages: 63-74, 2013.
41. Shinde, S., P. Bandi, D. Detwiler, and **A. Tovar**. *Structural Optimization of Thin-Walled Tubular Structures for Progressive Buckling Using Compliant Mechanism Approach*. SAE International Journal of Passenger Cars – Mechanical Systems, Vol. 6, Issue 1, Pages: 109-120, 2013.
42. **Tovar, A.** and K. Khandelwal. *Topology Optimization for Minimum Compliance using a Control Strategy*. Engineering Structures, Vol. 48, Pages: 674-682, 2013.
43. Lee, S., and **A. Tovar**. *Topology Optimization of Piezoelectric Energy Harvesting Skin using Hybrid Cellular Automata*. ASME Journal of Mechanical Design, Vol. 135, Issue 3, Pages: 031001.1-031001.12, 2013.
44. Arcos, W.J. and **A. Tovar**. *LQR optimal control of an exoskeleton for walking*. Intekhnia, Vol. 2, Issue. 2, 2013.
45. Penninger, C.L. **A. Tovar**, V. Tomar, and J.E. Renaud. *A high-fidelity HCA model for bone adaptation with cellular rules for bone resorption*. Journal of Surfaces and Interfaces of Materials, Vol. 1, Issue: 1, Pages: 60-70, 2013.

### 2012 (3 papers)

46. Yokota, H., **A. Tovar**, and A. Robling. *Dynamic Muscle Loading and Mechanotransduction*. BONE, Vol. 51, Issue 4, Pages 826-827, 2012.
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## STUDENT PAPERS

Publication in undergraduate research journals from students mentored by Prof. Tovar:

1. Theresa Marks, Gracie White, Scott Lohman, Mayank Malhotra. Mentors: Amanda Siegel, Andres Tovar. *Optimization of TPS Films using an Adaptive Design of Experiments Approach in Bayesian Optimization Framework*. Journal of Purdue Undergraduate Research (under review).
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3. Cardona, C., A.H. Curdes, A.J. Isaacs. Mentor: Andres Tovar. *Effects of Filament Diameter Tolerances in Fused Filament Fabrication*. The Indiana University Journal of Undergraduate Research. Vol.: 1, Issue: 1, Pages: 44-47, 2016, <https://doi.org/10.14434/iujur.v2i1.20917>.
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3. Patel, N.M., H. Agarwal, **A. Tovar**, J.E. Renaud, and D. Tillotson. *A Decoupled Approach to Reliability Based Topology Optimization for Structural Synthesis in Structural Design Optimization Considering Uncertainties*. Tsompanakis, Y., Lagaros, N. D., Papadrakakis, M. (Ed.), Taylor and Francis Series: Structures and Infrastructures, Frangopol, D. (Ed.). ISBN 0415452600, 2008.

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2. Seepersad, C., R. Arroyave, J. Guest, **A. Tovar** and Y. Wang. *Special Issue: Design of Engineered Materials and Structures*, J. Mech. Des 139(12), 128001 (Oct 12, 2017) (1 page), Paper No: MD-17-16455; doi: 10.1115/1.4038057, 2017
3. **Tovar, A.** *Editorial*, Revista Ingeniería e Investigación, National University of Colombia, Vol. 26, Issue 2, Pages 3-9, 2006.

## COURSE EVALUATIONS

List of courses taught at IUPUI, student enrollment, and student overall evaluation.

Semester	Course	Title	Enrolment (Num Resp)	Overall Evaluation	Dept. Average
Fall 2024	MSPE 298	Programming & modeling	26		
Spr 2024	ME 31002	Fluid Mechanics	50 (31)	3.47	3.40
Spr 2024	EEN 31000	Fluid Mechanics	5 (2)	3.93	3.40
Spr 2024	ME 27400	Basic Mechanics II	72 (30)	3.68	3.40
Fall 2023	ME 48200	Control Sys. Anl. & Des.	81 (44)	3.73	3.33
Spr 2023	ME 27400	Basic Mechanics II	69 (26)	3.29	3.23
Spr 2023	ME 59700	Opt Design of Mech Syst	8 (6)	3.94	3.45
Spr 2022	ME 33000	Model & Anal Dyn Syst	60 (28)	3.63	3.36
Spr 2022	ME 60601	Opt Design of Mech Syst	7 (6)	3.61	3.36
Fall 2021	ME 45310	Machine Design	76 (44)	3.64	3.34
Sum 2021	ME 59700	Topology Optimization	8 (5)	3.47	3.38
Spr 2021	ME 60661	Opt Design of Mech Syst	7 (5)	3.80	3.27
Fall 2020	ME 59700	Additive Manufacturing	17 (10)	3.18	3.10
Fall 2020	ME 45310	Machine Design	83 (36)	3.54	3.10
Sum 2020	ME 59700	Topology Optimization	14 (7)	3.26	3.27
Spr 2020	ME 59700	Des Cmplx and Origami	7 (6)	3.67	3.34
Spr 2020	ME 59700	Opt Design of Mech Syst	6 (5)	4.00	3.34
Fall 2019	ME 59700	Additive Manufacturing	20 (18)	3.70	3.27
Fall 2019	ME 45310	Machine Design	78 (59)	3.40	3.29
Sum 2019	ME 59700	Topology Optimization	14 (9)	3.67	3.33
Spr 2019	ME 59700	Des Cmplx and Origami	10 (8)	3.92	3.30
Spr 2019	ME 59700	Opt Design of Mech Syst	16 (22)	3.50	3.30
Fall 2018	ME 59700	Additive Manufacturing	47 (30)	3.53	3.26
Fall 2018	ME 45310	Machine Design	82 (47)	3.45	3.26
Sum 2018	ME 59700	Topology Optimization	14 (6)	3.50	3.46
Spr 2018	ME 59700	Des Cmplx and Origami	27 (14)	3.60	3.23
Fall 2017	ME 59700	Additive Manufacturing	49 (26)	3.50	3.20
Fall 2017	ME 45310	Machine Design	70 (49)	3.56	3.20
Fall 2017	ME 59700	Opt Design of Mech Syst	22(11)	3.55	3.20
Spr 2017	ME 59700	Des Cmplx and Origami	24 (15)	3.64	3.12
Fall 2016	ME 49700	Machine Design	70 (45)	3.56	3.18
Fall 2016	ME 59700	Additive Manufacturing	48 (24)	3.60	3.18
Sum 2016	ME 59700	Topology Optimization	7 (7)	3.90	3.15
Spr 2016	ME 59700	Opt Design of Mech Syst	28 (17)	3.59	3.15
Fall 2015	ME 49700	Machine Design	58 (42)	3.60	3.08
Fall 2015	ME 59700	Additive Manufacturing	44 (35)	3.66	3.08
Sum 2015	ME 59700	Topology Optimization	15 (N/A)	N/A	N/A
Spr 2015	ME 56200	Advanced Dynamics	24 (21)	3.57	N/A
Fall 2014	ME 27400	Basic Mechanics II	27 (9)	3.67	N/A
Fall 2014	ME 49700	Machine Design	28 (9)	3.89	N/A
Spr 2014	ME 59700	Opt Design of Mech Syst	14 (7)	3.86	N/A
Fall 2013	ME 39700	Design of Mechanisms	58 (26)	3.59	3.06
Fall 2013	ME 49700	Machine Design	28 (11)	3.09	3.06

Semester	Course	Title	Enrolment (Num Resp)	Overall Evaluation	Dept. Average
Spr 2013	EEN 24000	Basic Eng Mechanics	8 (3)	3.33	3.16
Fall 2012	ME 37200	Mechanical Design II	58 (26)	3.73	2.94
Sum 2012	ME 59700	Topology Optimization	15 (2)	3.50	N/A
Spr 2012	ME 37200	Mechanical Design II	53 (28)	3.89	2.98
Fall 2011	ME 27400	Basic Mechanics II	13 (8)	3.13	3.01

## STUDENT FEEDBACK

### COURSE EVALUATIONS 2024

“Dr. Tovar is an excellent professor. I could not recommend him more or think more highly of his teaching ability. He has an incredible gift with teaching and takes full advantage of it through making his own notes, color coding everything he writes on the board, and walking us through each of the quizzes and exactly how to solve them.” (ME 27400, Spring 2024)

“Professor Tovar is a very good mechanics professor and presented the material in an understanding way. His class structure allows for understanding while being welcomed to get help to further understand. For exams, he is clear on the content and provides a great amount of study tools for each exam.” (ME 27400, Spring 2024)

“Andres Tovar was one of the best professors I have ever had. While he has many research projects, he makes sure to set aside time for his students. He is relatable, and explains difficult topics clearly. This class has far advanced my understanding of dynamics from what I came in with from previous classes. Tovar has been exceptional in everyway.” (ME 27400, Spring 2024)

“Dr. Tovar is one of the best professor I have taken in the years I have been at school, he has helped me excel in my studies and is one of the most patient and trusting professor that you can get. I would love to nominate him for the professor of the year!!!!” (ME 27400, Spring 2024)

“Best instructor I've had! I attended few office hours with Professor Tovar and he is amazing, always helpful and approachable. I was scared about this course but he helped me a lot. I hope I have him in the Fall for fluid mechanics. I wish all professors were a little more like him honestly.” (ME 27400, Spring 2024)

“Professor Tovar not only makes the subject of dynamics very understandable and easy to learn but also has a caring and laid back nature that allowed me to always be comfortable during this semester.” (ME 27400, Spring 2024)

“Tovar is a phenomenal professor. He teaches the class in a way that even if you have no idea what is happening you can still learn. He takes time to explain things clearly. His notes are amazing, and easy to read and follow. His lecture is not boring and keeps you engaged. One of the best professors at IUPUI.” (ME 27400, Spring 2024)

“Dynamics is a really fun class, I thoroughly enjoyed it and Dr. Tovar is an excellent teacher who genuinely cares about student success.” (ME 27400, Spring 2024)

“This class was taught extremely well. The lectures were helpful, Andres Tovar explains topics well and in a way that students that do not know much about the subject can understand.” (ME 27400, Spring 2024)

“One of the best classes I have taken, I learned a lot, and I feel that most of it stuck with me.” (ME 27400, Spring 2024)

“The professor was very helpful at taking the time to make sure each question was answered and that each student understood what he was explaining. If there was a question he would stop what he was doing to make sure it was answered fully. The options for how to attend the class was very helpful as some people go to different schools and others live far away. It felt difficult for anyone to fall behind” (EEN 31000, Spring 2024)

“Andres Tovar is an outstanding professor. He always took the time to help me understand complicated concepts. I would definitely register for any of his courses in the future.” (EEN 31000, Spring 2024)

“This class was really fun and interesting. I enjoy that the videos of the lectures were posted so that we could go back and catch up on things we may need to double check from class.” (EEN 31000, Spring 2024)

“this class was really fun and interesting. I enjoy that the videos of the lectures were posted so that we could go back and catch up on things we may need to double check from class.” (EEN 31000, Spring 2024)

“Professor Tovar is the best. I want him to teach all the hard classes so everyone has a better experience in the class. I could go on and on about how great he is.” (ME 31002, Spring 2024)

“Tovar is a great professor, he explained things well and was always willing to help. I was always motivated to do well in his class. He did a great job.” (ME 31002, Spring 2024)

“Tovar was very helpful and recorded lectures so if clarification was needed you could go back and watch the lecture. I really like his approach to teaching and was very helpful and responded fairly quick to any questions asked” (ME 31002, Spring 2024)

“Our Professor did a great job explaining and breaking the course I definitely understand the course better than I did the first time” (ME 31002, Spring 2024)

“Professor Tovar was extremely prepared and well-versed in the teaching of the course. I couldn't have asked for a better preparation and delivery of the material.” (ME 31002, Spring 2024)

“Mad good at teachin bout fluids brav” (ME 31002, Spring 2024)

“Tovar was great. One of the best professors I've had. Explains the subject clearly while supporting the students.” (ME 31002, Spring 2024)

“Very organized notes, provided online resources for all lectures, and overall seemed to enjoy teaching the class which was directly reflected by the quality of education” (ME 31002, Spring 2024)

“very encouraging professor that teaches clearly” “Really good professor.” “one of the best ME professors” (ME 31002, Spring 2024)

“Dr. Tovar is a great professor for this subject. He delivers the material clearly and answers questions in-class. Dr. Tovar can also draw sketches of various things for the class quite well. The sphygmomanometer drawing was a highlight. Good class overall.” (ME 31002, Spring 2024)

## COURSE EVALUATIONS 2023

“One of if not the best professor I've ever had.” (ME 48200, Spring 2023)

“Professor Tovar is the best instructor I have had at IUPUI. He is deeply knowledgeable of the subject, makes lecture interesting and enjoyable, and is extremely quick to respond to questions outside of class. He also isn't shy to show the real-world application of his subject through tools, MATLAB, that we will use in the field.” (ME 48200, Spring 2023)

“One of the best professors i have had. He explains things thoroughly and in a way that is easily understandable. He is likeable and makes the lecture feel more enjoyable. It feels like he actually cares about teaching well and is always open to questions and critiques.” (ME 48200, Spring 2023)

“Professor Tovar really cares about his students. He wants to ensure the students learn the difficult material in a much simpler manner than just cram all these difficult topics at you. He wants as many students to succeed as possible. I would definitely take another class with Professor Tovar if possible.” (ME 48200, Spring 2023)

“One of the best professors I have experienced recently. I enjoyed his energy and experience brought to this class. With his structured content in his course, his careful and neat handwriting, and overall compassion towards his students leaves me with nothing other than kind words to share.” (ME 48200, Spring 2023)

“Fantastic professor—took time out lecture to answer questions thoroughly, reinforced concepts consistently with quizzes whose answers were covered in class, worked with students extensively during office hours to ensure comprehension. Made a potentially confusing subject very lucid. Took student success seriously, as evidenced by adjusting homework assignments if necessary, allowing a cribsheet in exams, and encouraging attendance.” (ME 48200, Spring 2023)

“Professor Tovar was a huge reason that I enjoyed this course so much. Not only does he explain the material extremely well but you can actually tell that he is passionate about what he is teaching. Professor Tovar always answered my questions very well and made sure that everyone understood the material.” (ME 59700, Spring 2023)

“Professor Tovar is very passionate about this subject. His course was well-organized and he was happy to answer questions.” (ME 59700, Spring 2023)

“A great course in which I learned a lot of very valuable and interesting material.” “Dr Tovar was a great instructor.” “Well laid out and instructed course.” (ME 33000, Spring 2023)

“Was always understanding of timing issues and let us utilize Zoom to participate in the class and still ask questions even when we couldn't be there in person.” (ME 59700, Spring 2023)

“Prof. Tovar is engaging, enthusiastic, and willing to work with Students when they need it.” (ME 33000, Spring 2023)



## COURSE EVALUATIONS 2022

“Prof Tovar is very well prepared and it is always a joy to come to his class. He makes his class motivated and really is a great instructor.” (ME 33000, Spring 2022)

“His handouts were very clear and helpful during exams and also assignments.” (ME 33000, Spring 2022)

“The organization and structure of this course was very much appreciated.” (ME 33000, Spring 2022)

“A course based on previous courses and a new update that takes those materials to another level of experience.” (ME 33000, Spring 2022)

“ME 33000 is one of my favorite courses that I have taken so far in my program. I had a few 'A-Ha' moments where a lot of 'pieces' of knowledge from courses came together to form something that can actually be applied in the real world. A good example is obtaining the current function for a second-order electrical system which involved topics from ME 27400 (dynamics), MATH 26600 (Differential equations), and ECE 20400 (Intro to Circuits).” (ME 33000, Spring 2022)

“Dr. Tovar is a great professor. All of his lectures were always extremely well organized and presented. He concisely answered any questions.” (ME 33000, Spring 2022)

“Passionate and a very effective lecturer.” (ME 33000, Spring 2022)

“Professor Tovar was very helpful when it came to helping us understand the course material and would do the best he could to point us in the right direction when we needed help.” (ME 33000, Spring 2022)

“Dr. Andres is one of my favorite instructors in my time in my IUPUI, really taught the class very well and explained everything in detail.” (ME 33000, Spring 2022)

“Always approached the questions very well and clarified it to the maximum. Hopefully I will have him later on my education. Overall fantastic instructor.” (ME 33000, Spring 2022)

“Very well thought out lectures with many examples.” (ME 33000, Spring 2022)

“Great experienced professional who's relatively recent graduate and very down to earth with the students.” (ME 33000, Spring 2022)

“Dr. Tovar has done a phenomenal job at explaining the topics in this course. Somehow he always managed to break down new pieces of information in a way that is easily understandable and digestible, which thus made the course feel very easy despite how advanced it is. I would highly recommend Dr. Tovar for anyone planning on taking this course (and really any course for that matter).” (ME 33000, Spring 2022)

“Tovar might have been the best instructor I've had so far at IUPUI. He has a unique style, and makes learning dry material much less cumbersome than it could be.” (ME 33000, Spring 2022)

“Good professor, his exams are very fairly written and do not feel unneedingly hard.” (ME 33000, Spring 2022)

“Loved the concept of the course and each day of class we learned something new. Bayesian Optimization helped me understand how I could see improvement with a few samples. This is helpful in manufacturing as predicting how a component is produced can cause many variable defects with trial and error. This application can cut down the unnecessary waste of material as it learns with each setup.” (ME 60661, Spring 2022)

“He made the topic very simple to learn with one single example that was re used in all the topics we learnt through out the course. Because of that the difference of different methods over the same example made very evident.” (ME 60661, Spring 2022)

“Dr. Tovar has set up a great classroom environment and does take time to answer student questions. I especially like that he records his lectures, as this subject is tough, and it is hard to catch everything in class. The verbiage can sometimes be difficult to understand from Dr. Tovar but if asked he explains it simply with no judgment.” (ME 60661, Spring 2022)

“Colab is very nice because now I can continue to practice python even if I will not have access to fancy Matlab after graduation. The homework is a challenge but I do give Tovar a lot of credit for his feedback. I have not had one professor in the graduate program give me any feedback besides Dr.Tovar, so thank you as I am better for it.” (ME 60661, Spring 2022)

#### COURSE EVALUATIONS 2021

“Very structured and fluid. The canvas page was perfectly organized and helpful with uploaded lectures allowing me to refresh any missed topics.” (ME 45310, Fall 2021)

“Very interesting course, and is very applicable to possible internship experience. Applied knowledge can help student conceptualize the ideas that are needed in a possible engineering career.” (ME 45310, Fall 2021)

“The best course ever” (ME 45310, Fall 2021)

“I truly enjoyed this class and have found that this class would be more useful than the required class 48200 Control System analysis. I believe this course should be a required course in Mechanical Engineering.” (ME 45310, Fall 2021)

“This course was great. It was very informative and has opened my eyes to a new section of engineering that I never really knew existed. This class was well organized and beautifully executed.” (ME 45310, Fall 2021)

“One of my favorite courses” (ME 45310, Fall 2021)

“I loved the setup of this class. The prof clearly cared about us understanding the process and was always more than willing to help clarify things. The lecture slides were a great resource for solving problems and I loved that he recorded lectures and made them available to us.” (ME 45310, Fall 2021)

“Much more difficult than I initially thought it would be (Not necessarily a bad thing). Fast paced, but the professor helped us along the way. First exam was incredibly difficult. overall fun class” (ME 45310, Fall 2021)

“I was amazed how interesting this course was. You are able to learn how to shape mechanical elements so they are optimized. I would recommend this course, however there is a steep learning curve for learning Python and solving a system of equations subject to constraints.” (ME 59700, Summer 2021)

“Great professor who is always available to communicate with. He knows the subject at hand and it shows in his lectures.” (ME 59700, Summer 2021)

“Dr. Tovar is a very skilled instructor, and I would enjoy taking another class from him.” (ME 59700, Summer 2021)

“I submitted an entry into "best IUPUI engineering professor" on Prof. Tovar's behalf because I think he truly is an outstanding educator” (ME 60601, Spring 2021)

#### COURSE EVALUATIONS 2020

“I very much enjoyed this class. It was probably my favorite of this semester, and I have no real criticisms of it or the professor.” (ME 45310, Fall 2020)

“This class built on a lot of what I have learned over the last couple years. I enjoyed this class and thought the material was good. I can see myself using information provided in this class in the real world” (ME 45310, Fall 2020)

“This class was one of my favorites this semester. The combination of asynchronous and synchronous content, helped students build a foundation in the concepts before working on actual problems. Professor Tovar was very good in his explanations and he helped me understand the material well.” (ME 45310, Fall 2020)

“The exams and coursework felt fair while still providing challenging problems that helped teach the material.” (ME 45310, Fall 2020)

“loved this class!” (ME 45310, Fall 2020)

“Overall, a great course. I really learned a lot about machine design.” (ME 45310, Fall 2020)

“Professor Tovar was great! He always explained things very carefully, in great detail to make sure we understood, and was so thorough about everything that I never felt lost. I have had a lot of engineering professors in the past who would explain a basic version of a problem and then leave us students to figure out how the harder versions worked ourselves, without much guidance, but Professor Tovar made sure we knew exactly how to approach everything we might have to do, which was awesome!” (ME 45310, Fall 2020)

“Very well explained, slides and videos were very well organized and helped me stay on top of the lectures, Professor Trovar has always emailed back almost always immediately, which helped me move

on with my studying, he has always offered further help with understanding the material.” (ME 45310, Fall 2020)

“This was a very fun class. I really enjoyed the material, but the professor made it even better. He walked through problems step by step which is a huge thing for me. I allows me to see the whole picture. His slides were instructional and his homework's were very useful.” (ME 45310, Fall 2020)

“Course grades were provided in a timely manner. All quizzes issued through canvas had immediate grading and the homework was returned in a reasonable amount of time. Professor Tovar was very skilled with technology and held our weekly classes with no technical difficulties.” (ME 45310, Fall 2020)

“Professor Tovar did an amazing job teaching this class. Many ME professors just click on through slides instead of working problems out but professor Tovar worked out problems in every class session in addition to providing us with detailed notes.” (ME 45310, Fall 2020)

“What a great professor would love to take more classes with him. He presented material well, his videos were great, and so were his note he gave us! I had everything I needed to pass. I think my only thing is the homework sometime either was confusing or missing something needed to solve the problem. Other than that loved him and would love to have him teach more courses!” (ME 45310, Fall 2020)

“Professor Tovar was great at explaining the concepts of machine design.” (ME 45310, Fall 2020)

“Professor Tovar is great! The lecture videos that were used to supplement the online meetings were excellent. I really enjoyed this class.” (ME 59700, Summer 2020)

“Great instructor. Gives good feedback and responds to email in time.” (ME 59700, Summer 2020)

“Some of the assignments in this class were definitely some of the coolest things I've done for an assignment. I very much enjoyed how rewarding the assignments are in terms of visual feedback.” (ME 59700, Spring 2020)

“Dr. Tovar is truly one of the best lecturers in the MEE department. He has a way of explaining complex topics in such a way that you forget that they're complex. He's also personable and makes an effort to know each student at least a little bit, which is rare and quite refreshing.” (ME 59700, Spring 2020)

“I think Tovar did an excellent job teaching this fascinating course.” (ME 59700, Spring 2020)

“This is my fifth class with Dr. Tovar and as always the class is built perfectly. The in class assignment system provides the perfect low risk environment to be able to learn the material in depth. Homework assignments were a good, challenging way to stretch what we know and put our understanding of the material to the test. The tests, for the most part, were a useful way to make sure you know the material well.” (ME 59700, Spring 2020)

“I really enjoyed working with Dr. Tovar on some of the methods used in design optimization. I believe it was a very useful course in terms of its application in industry. I think Dr. Tovar did a great job in teaching this class as he clearly has a great background/experience in this field. The method of lecture communication was very effective as he mainly taught/explained concepts from his memory, which made me follow along with what he was teaching a lot easily step-by-step. His in-class assignments were very

useful in helping understand each lecture's concepts as we go. I also appreciated Dr. Tovar in being flexible for moving over this class remotely to support the university decision due to the pandemic. His remotely lecture delivery set-up worked great and at least from experience it was no different that having in-person lecture mode, from productivity standpoint.” (ME 59700, Spring 2020)

“Taking courses with Dr. Tovar is always a joy. He's clearly incredibly knowledgeable of the material and wants to help everyone in the class learn it. Simultaneously he is flexible with how the course is laid out and makes sure that everything remains fair and doable. It makes me sad to graduate since this is my last course I get to take with Dr. Tovar.” (ME 59700, Spring 2020)

### COURSE EVALUATIONS 2019

“This has been the best course I have taken during my graduate studies at IUPUI. The blend of art and engineering is truly an intriguing and interesting aspect. Professor Tovar and Professor Wu were phenomenal.” “I really enjoyed this course! It is a very interesting take on Mechanical Engineering and made me think much more creatively than I would otherwise.” “I found this class to be extremely interesting and genuinely enjoyed doing the work.” “Exceptional. Dr. Tovar has been one of the best instructors at IUPUI for many years.” “Dr. Tovar rocks! He was very helpful when it came to working on projects and in class assignments.” “Dr. Tovar is a really fantastic professor who makes any subject he teaches really interesting.” “Dr. Tovar as always provided an engaging and exciting learning environment” (ME 597, Spring 2019).

“The course is great!” “One of the best professors I’ve had at IUPUI” “Professor Tovar is a great professor who cares about his students’ success and makes himself available to help them. He sets a comfortable learning environment that makes the class enjoyable.” “I really enjoyed having Dr. Tovar as an instructor. He is obviously an expert on topology optimization, but he is still great at explaining it to people who have never encountered it before. I think it is rare for a professor lecturing on their own area of expertise to do so in such an accessible manner.” “Professor Tovar is one of if not the best instructor on this campus! I wish I could have taken more classes with him!” “The instructor was excellent at teaching the material and was very willing to offer help and guidance when needed.” “Amazing lectures. Clearly knows the subject material well. Always will answer questions” (ME 597, Summer 2019).

“Dr. Tovar is a awesome professor, open to help student to achieve their goals and to learn the topic” “Professor Tovar was fantastic!” “Dr Tovar as usual was engaging and understanding. He was very good at clarifying any questions students had about the material or the course itself” “Good teaching skills.” “He is an excellent teacher. Very creative and unique methods, his classes were very interesting.” “He is an excellent teacher. Very creative and unique methods, his classes were very interesting.” (ME 597, Fall 2019).

“Professor was good. He helped the class learn and went through examples well with the class.” “Very good professor” “Tovar is a good teacher that clearly lays out the material and knows a lot about the topics and keeps the class interactive.” “A good professor who wants to see you do good in class” “Professor Tovar is extremely knowledgeable on the material. He provided outstanding materials to help us learn, and was always available for questions. I would gladly take another of his classes.” “The professor is very passionate about the material and cares about every student’s success in his course. He provides ample opportunity to get help from him directly if you’re having issues with anything pertaining to the class. He’s very attentive, organized, and provides you with all the tools you need to succeed. This was one of my favorite courses, and he definitely taught the course well and I learned a lot.” “Professor

Tovar was a great professor! Honestly one of my favorites in my engineering academic career here. His in-class exercises really helped me keep up to date with all of the material and engaged in the class. His exams are open note, open book, which is good, but they are hard of course. I really enjoyed his class overall.” (ME 45310, Fall 2019).

### COURSE EVALUATIONS 2018

“Andres Tovar is the best lecturer this school has. From his quick response to emails, very helpful office hours, and always approachable and helpful attitude, he is hands down a leading example of what a good professor should be. So many could learn from him. His lectures are very interactive and easy to follow. I cannot insist enough that other professors should take note of his lecture style.” (ME 597, Spring 2018).

“I learned so much about complex optimization through this class. It was incredibly helpful in teaching me to be more proficient with Matlab and other optimization software and gave me a good introduction to the concepts behind these topics.” (ME 597, Spring 2018)

“Professor Tovar was extremely knowledgeable about the course material and recent developments in the field. His lectures were engaging, and his answers to questions asked in class were very helpful. He was cheerful and treated all students with respect.” (ME 597, Summer 2018). “Always a great class with Dr. Tovar.” (ME 597, Summer 2018). “Dr. Tovar is a great professor. This is my first time I have had him as a professor and I am very impressed with all his accomplishments. He is an expert of the material he is teaching. He is very well fit to keep teach this course and many more optimization courses.” (ME 597, Summer 2018)

“I really liked Professor Tovar and his teaching methods. All of his materials were thorough and well organized. He would draw extra sketches in class that were always very clear and helped explain finer details. I thought the topics were exactly what I would want to learn. Including videos online of examples of products or processes were helpful and enlightening. His enthusiasm for the subject came through and made me excited about additive manufacturing.” (ME 597, Fall 2018). “Dr. Tovar is very organized with his lectures, which makes them easy to follow and take notes from. He keeps the class interesting and the in-class assignments keep us students engaged. I think some of the projects and assignments he assigns are truly helpful and sometimes very enjoyable.” (ME 597, Fall 2018)

“Professor Andres taught the subject in unique approach which helps to understand it's research & industrial application.” “Very good teacher!!” “He is good.” “The professor was suitable to teach the subject. I got to learn various things about the subject under Professor Andres Tovar.” (ME 597, Fall 2018). “Easily the best course I have taken in the ME department. Every single assignment was clearly a real world application. The in class assignments forced me to keep up with lecture material while simultaneously lightening the homework load. Every lecture was presented in a clear and consistent way.” (ME 45310, Fall 2018)

“Prof. Tovar is the best instructor I've had this semester, he knows the material very well and walks us through the problems and trying hard to deliver us the information the easiest way possible. His in class assignments are the keyword for that class, the problems he chooses and the detailed way he solves makes us more confident to do his exams and assignments and having a good understanding of the topics. He is really neat and updated, the way that making us following up with him and more attracted to the class in general. His tests are pretty decent too. Overall he is one of the most valuable instructors I've ever had in IUPUI although of his young age, i'm even taking other course with him next semester. The most strong point that differs him from other instructors that when he messes up he admits it, not trying to argue or

cover his mess with any reason wither it makes sense or not. Tovar is the best” (ME 45310, Fall 2018), “Dr. Tovar is without a doubt the best professor I've had in college. He makes learning fun and engaging. It has gotten to the point where I am actively seeking out classes to take with him.” (ME 45310, Fall 2018). “Dr. Tovar is the best instructor on IUPUI's campus. He is respected and valued. He teaches very difficult subjects, but has a way of making these difficult topics understandable.” (ME 45310, Fall 2018)

#### COURSE EVALUATIONS 2017

“Dr. Tovar is undoubtedly the greatest instructor in this department. He shows passion for the material. He is always willing to help his students. Several times throughout the semester he has stayed late to help students with projects, homework, in-class assignments, and to answer any other questions. He speaks to his students with respect. The students are engaged. His lecture slides are well organized, written in proper English, and quite thorough. He speaks clearly and projects his voice throughout the lecture hall. Dr. Tovar demonstrated that he was genuinely interested in our education. It has been refreshing to be in a course that I actually learned something in and enjoyed attending. It would be a wise decision for the university to begin employing more professors with the same work ethic, compassion, and dedication.” (ME 45310, Fall 2017)

“Andres Tovar was one of the best teachers I have had in the Mechanical Engineering department. He was very good at explaining concepts, answering questions, and making sure we had all of the materials we needed. I was very impressed by the job he did this semester.” (ME 45310, Fall 2017)

“Andres Tovar is very organized and goes out of his way to improve his students understanding of the material. He makes class interesting enough to motivate students to attend, and always works to improve student's understanding.” (ME 45310, Fall 2017)

“Professor Tovar is one of the best professors I have had here at IUPUI. He teaches incredibly clearly and at a great pace. He is always willing to help and answer questions and genuinely cares about his students. He is awesome” (ME 45310, Fall 2017)

“He is one one of the best teacher's, He made all the complex theories so easy to understand with practical applications. I would never miss his lecture for any thing. Once you attend his class, then you don't have to read the text book.” (ME 597, Fall 2017)

“He encouraged me for my idea for final project. He clears doubts at anytime of the day or night(via email), Never said he's busy or never asked me to come back. Always helped me learn and optimized my ideas with great examples. He is my Favorite teacher.” (ME 597, Fall 2017)

“He is always been helping students coming with new ideas and motivates them. His teaching style helps us to understand some of the toughest concept very easily.” (ME 597, Fall 2017)

#### COURSE EVALUATIONS 2016

“Kind and brilliant professor”. “Dr. Tovar is an excellent instructor. He has a lot of experience in the subject.” (ME 597, Spring 2016)

“Professor is exceptionally knowledgeable.” “AMAZING instructor. It is rare to find an instructor so dedicated to educating students.” (ME 597, Summer 2016)

“Prof. Tovar was arguably the best professor I've had at IUPUI thus far. He was extremely organized every class, he had very easy to follow notes, he answered all questions that the class had in an effective manner, and overall it seemed that he really cared about making sure everyone understood the material. He even subbed in for a 372 class I had and that was the best 372 lecture I had all year. Prof. Tovar is the man.” (ME 497, Fall 2016)

“Prof Tovar is by far one of the most effective teachers in the entire ME department. He teaches the theory in the book very well. But he also shows how it relates to the real engineering world by showing us how to go about finding catalogs and references that engineers use in practice. THE BEST TEACHER EVER” (ME 497, Fall 2016)

“Professor Tovar was great at making the course interesting and keeping the class involved. His in-class assignments that were completed at the end of each session made sure that everyone had exposure to the material that we had just learned. Putting most of the equations and principles that we learned to use immediately allowed for a more thorough learning experience. I would absolutely take another course associated with Professor Tovar, and am thankful for the job that he did with Machine Design this semester.” (ME 497, Fall 2016)

“Professor Tovar is always clear and concise about the subject material. He takes a genuine interest in his students' learning and provides as much material as possible on his part to help us out. He also always took time in and out of class to walk students through every type of problem that we could potentially see; so it never felt like we were left in the dark without the necessary knowledge to approach any problem. One of the best professors I have ever had, other engineering course professors could benefit from examining his teaching style.” (ME 497, Fall 2016)

“Best professor I have ever had in my 4 1/2 years at IUPUI. I felt bad if I didn't perform as well as I had hoped on an exam because I didn't want to disappoint him haha. His notes are awesome and he does a good job of explaining every single step.” (ME 497, Fall 2016). “Best teacher and class I have ever taken at IUPUI” (ME 497, Fall 2016)

“I greatly enjoyed the material covered in this course. I was not expecting as much process as was covered but I found it helpful and would strongly recommend it to anyone interested in manufacturing and/or additive manufacturing.” (ME 597, Fall 2016). “Tovar is very excited about this topic and it energizes his classroom environment to encourage learning.” (ME 597, Fall 2016). “One of the best faculty in the entire mechanical department. Clears out every single doubt and a very understanding professor. Every topic taught by him is easy to grasp and a fun environment to learn.” (ME 597, Fall 2016). “Professor Tovar made the class easier and more enjoyable with his teaching method. I would definitely enjoy other classes he teaches based on his performance in this course.” (ME 597, Fall 2016)

### COURSE EVALUATIONS 2015

“In my opinion, Professor Tovar is one of the best professors at IUPUI. His lecture notes are easy to follow and he explains every topic very well. You can tell he is passionate and he is very approachable when students have questions.” (ME 562, Spr 2015)

“Dr. Tovar is great. Always understanding and willing to assist. I would take any class no matter the difficulty with him. Overall, I give him an A+.” (ME 562, Spr 2015)



“Extraordinary instructor who know how observe students, how teach and how have a good relationship with his students to release their minds to be able to focus on their studying.” (ME 562, Spr 2015)

“The professor was very much to the point and provided a wealth of interactive examples with his teaching style.” (ME 562, Spr 2015). “Easily the best professor of my academic experience.” (ME 562, Spr 2015). “Professor Tovar is one of the best professors in the ME department. Maybe best I have ever had.” (ME 562, Spr 2015). “You should teach a class on how to teach classes. The lectures are very easy to follow.” (ME 497, Fall 2015)

“This course is great. I feel that I will use everything this course covered in my career. The material was presented in a clear and precise manor. The professor was extremely knowledgeable and professional.” (ME 497, Fall 2015)

“Dr. Tovar truly understands the material, and is able to convey it in a way that makes it easy for the students to understand.” (ME 497, Fall 2015)

“One of the better classes I have taken. You can tell that he likes his job and loves teaching.” (ME 497, Fall 2015)

“Good instructor with clear and well teaching skill!” (ME 497, Fall 2015)

“Both the class and the lab overall are an excellent idea, since it allows students to see and create first hand their 3D printer.” (ME 597, Fall 2015)

“One of the best classes I've taken so far. Thank you Dr. To[var] for putting in so much effort to design this course.” (ME 597, Fall 2015)

“One of the most interesting classes I have taken so far.” (ME 597, Fall 2015)

“Great professor, very passionate and knowledgable on the subject. Would be happy to take any other classes.” (ME 597, Fall 2015)

“Highly interactive, well informed and understanding instructor, Dr. Tovar.” (ME 597, Fall 2015)

“He is a great teacher. I would like him to teach other courses.” (ME 597, Fall 2015)

#### COURSE EVALUATIONS 2014

“Prof Tovar is fantastic at teaching this course. You can tell that he has a true understanding of the subject and didn't hesitate to answer questions during class. I also enjoyed how class didn't seem like lecture but instead an ongoing conversation.” (ME 497, Fall 2014).

“One of the best profs at IUPUI” (ME 497, Fall 2014).

“I found the in class assignments great because they were great examples of real life applications of the things we were learning about.” (ME 497, Fall 2014).

“I found the notes very easy to follow and organized. It made catching up in class very easy to do.” (ME 497, Fall 2014).

“I looked forward to attending this class every time because I knew that the application of the material was very relevant to what I want to do after I graduate” (ME 497, Fall 2014).

“Always very clear and knowledgeable on the subject” (ME 497, Fall 2014).

“great teacher” (ME 274, Fall 2014).

“It was nice that he complimented the student for things he did right, not just point out the mistakes.” (ME 597, Spr 2014).

“I learned a good deal from this class! I have already recommended this professor to other students.” (ME597, Spr 2014).

“Dr. Tovar was professional and courteous. I think it was evident that he wanted to see the students succeed. I think he's a good professor and would take another class from him if given the opportunity.” (ME 597, Spr 2014).

“He invited questions and demonstrated a good attitude.” (ME 597, Spr 2014).

“Very great job! I love the way the class was structured. This has been the class with the best structure (from all the classes I have taken before.)” (ME 597, Spr 2014).