

**Clemson University**  
**College of Engineering, Computing, and Applied Sciences**  
**Department of Mechanical Engineering**

**RESUME**

Joshua D. Summers

**CONTACT DATA**

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**BIOGRAPHY**

Joshua D. Summers, Professor in Mechanical Engineering at Clemson University, co-directs the CEDAR Group (Clemson Engineering Design Applications and Research), is the Director of Graduate Studies and Associate Chair for Mechanical Engineering, and is the Director for Educational Initiatives for the Center for Advanced Manufacturing. Dr. Summers earned his Ph.D. in Mechanical Engineering from Arizona State University researching design automation. Dr. Summers received his BSME and MSME from the University of Missouri-Columbia working on VR-based submarine design. Dr. Summers has worked at the Naval Research Laboratory (VR Lab and Naval Center for Applied Research in Artificial Intelligence) and served on the Foreign Relations/Armed Services staff of Senator John D. Ashcroft. Dr. Summers' research has been funded (>\$18M) by government (NASA, NSF, US Army TACOM), large industry (BMW, Michelin, General Motors), and small-medium sized enterprises (Wright Metal Products, Hartness International, and others). Dr. Summers' areas of interest include collaborative design, knowledge management, and design enabler development with the overall objective of improving design through collaboration and computation. The work has resulted in over 300 peer reviewed publications. Dr. Summers teaching interests has resulted in introduction of four new courses in engineering design, revamping of the senior design program, and the introduction of an international study abroad experience for senior engineers. This research and teaching has been recognized with awards from SAE (Ralph Teetor Award and Arch T. Colwell Merit Award), TMCE (Outstanding Researcher Award), Innovision (Innovations in Education), the Toshiba-Kos Ishii DFMLC Award (research contributions to Design for Manufacturing), the South Carolina Governor's Award for Scientific Awareness, and with election to Fellow status in ASME (2012). Most significantly, Dr. Summers has been the advisor of record for 4 post-doctoral students, 13 completed PHD dissertations, 50 MS theses, 11 MS projects, 2 honor's undergraduate thesis, and currently supervises over a dozen graduate and undergraduate students. All of his former post-doctoral advisees and three PHD students are currently in academic positions at Clemson University, Texas State University, St. Louis University, North Texas University, Florida Tech, and James Madison University.

**Short Bio**

Joshua D. Summers, Professor in Mechanical Engineering at Clemson University, co-directs the CEDAR Group (Clemson Engineering Design Applications and Research). Dr. Summers earned his Ph.D. in Mechanical Engineering from ASU (design automation) and his MS (submarine design) and BS (fluidized bed design) from University of Missouri. He has worked at the Naval Research Laboratory (VR Lab and NCARAI). Dr. Summers' research has been funded by government, large industry, and small-medium sized enterprises. His areas of interest include collaborative design, knowledge management, and design enabler development with the overall objective of improving design through collaboration and computation.

**EDUCATION**

- Ph.D., Arizona State University, 2004, Mechanical Engineering  
*Development of a Domain and Solver Independent Method for Mechanical Engineering Embodiment Design*  
 Advisor: Jami J. Shah
- M.S., University of Missouri-Columbia, 1998, Mechanical Engineering  
*Feature Based Design in a Virtual Environment for Early Stage Submarine Design*  
 Advisor: Alley Butler (currently Professor at University of Texas-Pan American)
- B.S., University of Missouri-Columbia, 1996, Mechanical Engineering

**Professional Registration**

Engineer in Training, Missouri, Fall 1995 (No. 042821)

**PROFESSIONAL EXPERIENCE**

- Clemson University, 2018-present, Associate Chair of Mechanical Engineering  
 Clemson University, 2016-present, Special Assistant to the Dean for Minority and Academic Initiatives  
 Clemson University, 2014-present, Director of Graduate Studies in Mechanical Engineering  
 Clemson University, 2012-present, Professor of Mechanical Engineering  
 Grenoble Institute of Technology, 2012-2013, Visiting Professor  
 Clemson University, 2011-2012 and 2013-2014, Clemson University Service Alliance Faculty Fellow  
 West Virginia University, 2011-2013, Adjunct Professor of Mechanical and Aerospace Engineering (in support of Collaborative Mexico Senior Design Program)  
 Clemson University, 2010-2013, IDEaS Professorship (Named Professor) of College of Engineering and Science  
 Clemson University, 2008-2012, Associate Professor of Mechanical Engineering  
 Clemson University, 2002-2008, Assistant Professor of Mechanical Engineering  
 Naval Research Laboratory, 2003, ONR/ASEE Summer Faculty Fellow, Advanced Decision Aids Group, Naval Center for Applied Research in Artificial Intelligence  
 Arizona State University, 1999-2002, Research Assistant  
 Arizona State University, 1999 and 2001, Teaching Assistant  
 Arizona State University, 1998-1999, MESA (Mathematics, Engineering, and Science Achievement) Liaison  
 Arizona State University, 1998-1999, Minority Engineering Program Mentor and Tutor  
 Naval Research Laboratory, 1997 and 1998, Intern for VR Laboratory  
 Senator John D. Ashcroft's Washington, DC Office, 1998, Intern for Foreign Relations and Armed Forces  
 Louisiana Tech, 1997-1998, Research Associate  
 Shell and Associates, 1997, Environmental CAD Engineer  
 University of Missouri-Columbia, 1996-1997, Teaching Assistant  
 Kansas City Power and Light, 1992 and 1993, Intern

**Employment (Complete)**

- 1986-1991 Western Missouri Soccer League, *Kansas City, MO*, USSF certified soccer official.  
 1988-1990 Stitt's Industries, *Liberty, MO*, Electronics Assembly.  
 1989-1991 Private Tutor (five children, ages 8-12; topics: science, math, social studies)  
 1990-1991 Mid-Continent Public Library, *Liberty, MO*, Library Page.  
 1991-1992 Missouri Future Problem Solving, *Columbia, MO*, Statewide Newsletter Editor and coordinator for high school competition judging.  
 1992 Memorial Union Café, *Columbia, MO*, Janitor  
 1992-1993 University of Missouri, *Columbia, MO*, Intramural sports official (Soccer)  
 1992-1995 Mid-Missouri Soccer, *Columbia, MO*, USSF certified soccer official, Missouri State High School Athletic Associate certified soccer official.  
 1992 Alpha Epsilon Phi Sorority, *Columbia, MO*, Kitchen Staff  
 1992-1996 Montgomery Wards, *Columbia, MO*, sales associate (house wares, electronics, automotive)  
 1992-1993 Kansas City Power and Light, *Kansas City, MO*, summer engineering internship

- 1993-1995 Montgomery Wards, *Kansas City, MO*, sales associate (paint, window treatment, automotive)
- 1992-1993 Liberty Public Schools, *Liberty, MO*, Substitute Teacher (grades 5-12)
- 1993 Liberty Public Schools – Latchkey, *Liberty MO*, Summer Professor (French, Japanese, Aerodynamics)
- 1995 JC Penney's, *Columbia, MO*, Sales Associate (window treatment)
- 1995-1997 Stevenson's Inc., *Columbia, MO*, purchasing agent (food and baby formula)
- 1997 Shell Engineering and Associates, *Columbia, MO*, CAD engineer and environmental auditor
- 1997 Square-D, *Columbia, MO*, assembly line worker for manual fabrication of circuit breakers
- 1996-1997 University of Missouri, *Columbia, MO*, Teaching Assistant (AutoCAD)
- 1997 University of Missouri, *Columbia, MO*, Research Assistant (Feature Based Design)
- 1997-1998 Louisiana Technological University, *Ruston, LA*, Research Assistant (Feature Based Design)
- 1997 JC Penney's, *Alexandria, VA*, Sales Associate, (house wares)
- 1997-1998 Naval Research Laboratory, *Washington, DC*, VR Lab Intern
- 1998 Arizona State University, *Tempe, AZ*, Math, Engineering, and Science Achievement Program Liaison to High Schools and Junior High Schools
- 1998 Arizona State University, *Tempe, AZ*, Minority Engineering Program tutor for math, physics
- 1998-2002 Private tutoring (1 student; electrical engineering undergraduate)
- 1999 Arizona State University, *Tempe, AZ*, Technical Assistant, system administrator for UNIX and Windows research and teaching computing labs
- 1999-2000 Arizona State University, *Tempe, AZ*, Teaching Assistant, junior machine design, senior advanced machine design, graduate design automation
- 1999-2002 Arizona State University, *Tempe, AZ*, Research Associate (Design Exemplar)
- 2002-2008 Clemson University, *Clemson, SC*, Assistant Professor in Mechanical Engineering
- 2003 Naval Research Laboratory, *Washington, DC*, ASEE Summer Faculty Fellow in Artificial Intelligence Lab
- 2006-2008 Soccer Officiating, *Clemson, SC*, FIFA, USSF, Collegiate, High School
- 2006- Engineering Consulting, *Clemson, SC*, (Rockwell Automation, Swimdock, EAI, Hoowaki, Georgia Tech)
- 2008-2012 Clemson University, *Clemson, SC*, Associate Professor in Mechanical Engineering
- 2012-2013 Grenoble Institute of Technology, *Grenoble, France*, Visiting Professor
- 2012- Clemson University, *Clemson, SC*, Professor in Mechanical Engineering

### **Consulting Experience**

- JSV Group, Seneca, SC, (2006), provided kinematic mechanism design for floating dock stairs (\$3k for student support)
- Rockwell Automation, Greenville, SC, (2007) provided design for manufacturing and assembly analysis on competitor benchmark motors (\$2k for Summers' support)
- Environmental America Incorporator, Greenwood, SC, (2007-2008) provided engineering advise on the design and prototyping of an integrated trash and recycling truck (\$16k for student support)
- Hoowaki, Anderson, SC (2010) provided design automation development for pillar sizing (\$1k for Summers)
- Georgia Tech, Atlanta, GA (2012) provided proposal writing and workshop organization support on the NSF funded project (co-PI – all funding through Georgia Tech)
- Hoowaki, Anderson, SC (2013) provided simulation and optimization evaluation of proposed structures (\$4k for Summers and Fazelpour)
- Workbench, Bangalore, India (2014-present), external advisor to startup company that provides "maker space" for entrepreneurs and college students. Review proposals, business plan, provide feedback (volunteer)

### **Leadership and Initiatives**

- Department: Director of Graduate Studies (Fall 2014-present)
- As the Director of Graduate Studies, I have the responsibility for recruiting, admissions, policy development, curriculum review, new student advising, orientation and training, staff supervision and mentoring, and program evaluation and assessment. Our program has

expanded to Charleston offerings, introduced limited on-line graduate courses, and increased female graduate enrollment (~30%). I have chaired the search committees for hiring all three current student service coordinators and have direct supervisory responsibility for the graduate student service coordinator. I established a transparent and systematic process for Graduate Grading Assistantship requests and hiring. I have coordinated with the Laboratory Supervisors (Drs. Wagner and Schweisinger) in developing a transparent process for reviewing and hiring Graduate Laboratory Assistants. I established a new “research week” tradition for the Fall semesters in which we invite alumni in academia to return for research presentations and discussion on what graduate school at Clemson meant to them.

College: Assistant to the Dean for Academic and Minority Initiatives (Fall 2016-present)

In this special position, I have been tasked with working with colleagues in expanding the Mechanical Engineering program in Charleston (Growing from 3 students in Spring 2015 to 9 students in Spring 2016 to 20 students in Spring 2017).

I have worked with the PEER (minority) and WISE (women) programs at Clemson to introduce a bi-weekly discussion group that focused on thinking beyond graduation and how we can find our true vocations. This program included invited alumni in industry and faculty from various CECAS departments. We also arranged to have faculty hold office hours in the PEER Study Hall as a means of expanding the reach and diversity of users of the Study Hall.

I have also worked with colleagues in arranging for graduate focused visits for students from UMBC, Spellman, Morehouse, and Francis Marion. I am working with the CECAS ADRGS office in defining a template for such visits in the future that includes targeted activities, budgets, contact information, and other logistical aspects to facilitate future visits.

I have represented the college on recruiting trips that included UMBC, James Madison University, and Oak Ridge National Laboratory.

I have been appointed as the CECAS representative to the Clemson University Council for Diversity and Inclusion. This Council will meet quarterly to provide feedback, guidance, and coordination on the University efforts.

University: Faculty Senate (2013-2016 & 2017-present)

I have been elected twice to the Faculty Senate and have served as the chair of the Finance Committee (2015-2016) and the Research Committee (2017-present). As the chair of the committees, I am tasked with defining the mission and goals for the committee, coordinating visits from University officials (Provost, Associate Provosts, Deans, Chairs, CFO, VPR, Associate Deans) to discuss relevant topics. Delegated tasks to committee members and coordinated the reporting from the committees to the Executive Advisory Committee of the Senate.

Professional Society: ASME CIE Division

I have served in many leadership positions for both the ASME Computers and Information in Engineering Division and the Design Engineering Division. One major initiative that I started was the CIE Graduate Student Poster session where graduate students share pre-publication research work to get feedback from faculty at different universities. This program now includes, at my initiation, travel grants from the CIE Division. The poster competition have now been supported with travel grants for over seven years and is formally coordinated by the CAPPD Technical Committee.

In my tenure on the ASME CIE Division’s Executive Committee, concluding with my term as Past Chair in 2015-2016, I initiated a new award in 2013: Best Dissertation Award. This award, given annually since 2013 recognizes PHD students’ work based on the potential impact of the work, the quality of the research approach, and the quality of the written thesis.

## **PROFESSIONAL ACTIVITIES**

### **Memberships**

Member, American Society of Mechanical Engineers, ASME, (1992-present)

Elected Fellow in 2012

Member, The Design Society (2003-present)

Program Evaluator (PEV), ABET (Accreditation Board for Engineering and Technology), (2015-present)  
2015 (Observer Visit completed)

2016 (reviewed top 10 ME program)  
 2017 (reviewed Very High Research University)  
 2018 (reviewed HCBU)

Member, International Council on Systems Engineering, INCOSE (2013-2014)  
 Member, American Society of Engineering Educators, ASEE, (2001-2010)  
 Member, Society of Automotive Engineers, SAE, (2006-2012)  
 Member, Association for Computing Machinery, ACM, (1997-2008)  
 Member, Institute of Electrical and Electronics Engineers, IEEE, (2000-2005)

### **Editorial Service**

ASME, Journal of Computing and Information Science in Engineering, Associate Editor (2018-); topical area of Computer Aided Design (nominated August 2017)  
 Editorial Board: Journal of Design Research (2017-present)  
 Editorial Board: Journal of Computational Design and Engineering (2016-present)  
 ASME, Journal of Computing and Information Science in Engineering, Associate Editor (2013-2016); topical area of Computer Aided Design  
 Special Issue Editor: Artificial Intelligence in Engineering, Design, Analysis, and Manufacturing (2017), led the editorial team that includes C. Eckert (The Open University), S. Venkataraman (SUTD), C. Sen (FIT), and M. Bohm (Florida Poly).

### **Service**

American Society of Mechanical Engineers, Computers and Information in Engineering Division, Executive Committee member (2009-2016)

- Positions:
  - 2015-2016, Past Chair and Awards Chair
  - 2014-2015, Division Chair
  - 2013-2014, Conference Chair
  - 2012-2013, Program Chair
  - 2011-2012, Secretary
  - 2010-2011, Member-at-Large
  - 2009-2010, Incoming Member
- organized a PhD student and Faculty mentoring session at the 2009 DETC/CIE conference in San Diego, CA and for the 2010 DETC/CIE conference in Montreal, Canada
- organized ASME fellow nomination package for several past CIE executive committee members (Crawford, Krishnan, Paredis)

American Society of Mechanical Engineers, Computers and Information in Engineering Division, Computer Aided Product Development Technical Committee, Chair, (2007-2008); Vice-Chair, (2006-2007)

American Society of Mechanical Engineers, Design Engineering Division, Design Theory and Methodology Technical Committee, Vice Chair (2011-2013)

American Society of Mechanical Engineers, Computers and Information in Engineering Division, organized a special poster session for graduate students to present current pre-proposal work at the 2007 DETC/CIE in Las Vegas, NV and at the 2008 DETC/CIE in Brooklyn, NY. This activity has now been formalized as a NIST/CAPPD sponsored activity and has been replicated in 2009, 2010, 2011, 2012, 2013, 2014, and 2015 (NSF proposal is being developed for future support).

National Science Foundation, Review Panelist, (six panels)

Founding Member of Special Interest Group on Collaborative Engineering Innovation for the Design Society (2003)

American Society of Mechanical Engineers, Session Chair, Computers in Engineering, Design Automation Committee (2002-2007)

American Society of Mechanical Engineers, Review Coordinator, Computers and Information in Engineering, Design Automation Committee, Design Theory and Methodology (2003-2009)

American Society of Mechanical Engineers, Special Topic Session organizer, Computers and Information in Engineering, (2009)

Reviewer for (journals): Journal of Mechanical Design (2001-present); IEEE Journal of Systems, Man, and Cybernetics (2001); Journal of Computing and Information Science in Engineering (2002-present); Artificial Intelligence in Design, Engineering, Analysis, and Manufacturing (2003-present); Advanced Engineering Informatics (2004); Knowledge Engineering Systems (2004); Journal of Engineering Design (2005-present); Omega (2005); Computers in Industry (2005); International Journal of Electronic Business Management (2006); Journal of Robotics and Computer Integrated Manufacturing (2006); Computer Aided Design and Applications (2007-present); International Journal of Product Development (2007); Journal of Computer-Aided Design (2008-present); Research in Engineering Design (2009-present); Journal of Terramechanics (2009); Virtual Reality Journal (2009); Advanced Engineering Informatics (2010-present); Journal of Engineering Manufacture (2010-present); International Journal of Engineering Education (2011-present); Journal of Mechanical Engineering Science (2011-present)

Reviewer for (conferences): ASME DETC/CIE conference (2001-present); Tools and Methods of Competitive Engineering (2003-present); ASME IMECE (2005-present); Virtual Concept (2005-present); NSF ASME Design Essay (2005-present); Computer-Aided Design Conference (2007-present); International Conference of Engineering Design (2007-present); Design Creativity and Cognition Conference (2008-present); ASME WINVR (2010); Manufacturing Science and Engineering Conference (2008-present); Design Structured Matrix Conference (2007-present)

Book Reviewer for: The Mechanical Design Process, D. Ullman (2007); Metal Forming: Mechanics and Metallurgy, 3rd Ed., Hosford and Caddell (2006); Mechanical Engineering Design, 7th Ed., Shigley, et al., (2004); Engineering Problem Solving, Milton C. Shaw, (2001)

Proposal Reviewer: Hong Kong Initiation Grant (2010); NASA (2008)

Organizing Committee: Design-Croatia (2010); International Conference on Manufacturing Automation (2010); Design Structure Matrix Conference (2009); ASME Asia Pacific Engineering Education Conference (2009)

## PUBLICATIONS

Total Refereed Publications: 337

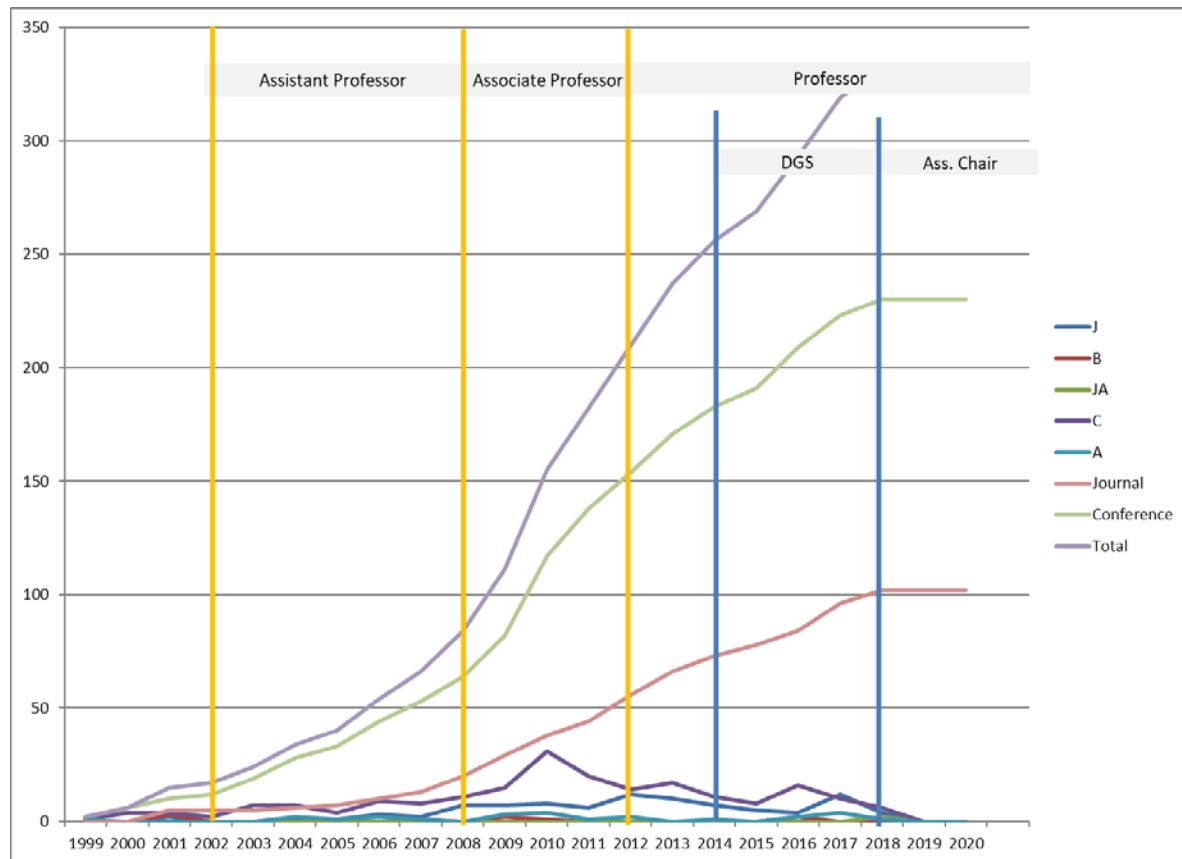
Summary Journal/Chapters: Journal = 92, Accepted/In-Press = 4, Book Chapters = 9; Total = 104

Summary Conference: Full Paper Review = 206; Abstract Reviewed = 26; Total = 232

Citation Information (Google Scholar, July 29, 2018 – note: may include student theses)

Citations = 4168; cites/year = 210.9; cites/paper = 12.4; h-index = 30; i10-index = 130

The figure illustrates the publication trends. The stages of my professional life are delineated for clarity (Figures generated May 2018).



### Refereed Journal Publications

#### Accepted

- Ja4. Gill, A., Summers, J., (2018), "Impact of Chaining Method and Level of Completion on Accuracy of Function-Structure Based Market Price Prediction Models", *ASME Journal of Computing and Information Science in Engineering*, accepted July 2018, (Summers is corresponding author). No. JCISE-18-1081.
- Ja3. Joshi, S., Morkos, B., Summers, J., (2018), "Mapping Problem and Requirements to Final Solution: A Document Analysis of Capstone Design Projects", *International Journal of Mechanical Engineering Education*, accepted May 2018, (Joshi is corresponding author).
- Ja2. Joshi, S., Morkos, B., Summers, J., (2018), "Investigating the Impact of Requirements Elicitation and Evolution on Course Success in Senior Design", *Journal of Engineering Design*, accepted May 2018, (Morkos is corresponding author).
- Ja1. Phelan, K., Summers, J., Kurz, M., (2018), "Rule Authoring for Vehicle Configuration Management: An Experimental Study on Graph Based Representations", *International Journal of Mass Customisation*, accepted Oct. 2017.

#### Published

- J92. Salmi, A., David, P., Blanco, E., Summers, J., (2017), "A Cost Estimation Model to Support Automation Decision in Assembly Systems Design", *International Journal of Production Research*, (online June 2018), doi: 10.1080/00207543.2018.1486050.
- J91. Fazelpour, M., Summers, J., Shankar, P., Patel, A., (2017), "Design Guidelines as Ideation Tools: A User Study on Exploring the Subjectivity of Unit-Cell Design Guidelines", *International Journal of Creativity and Innovation*, (online May 2018), doi: 10.1080/21650349.2018.1473170.
- J90. Yoder, M., Thompson, L., Summers, J., (2018), "Size effects in lattice structures and a comparison to micropolar elasticity", *International Journal of Solids and Structures* (online March 2018), Doi: 10.1016/j.ijsolstr.2018.03.013.

- J89. Morkos, B., Dochibhatla, S., **Summers, J.**, (2018), "Effects of Metal Foam Porosity, Pore Size, and Ligament Geometry on Fluid Flow", *ASME Transactions, Journal of Thermal Science and Engineering Applications*, **10 (4)**, TSEA-17-1240, doi: 10.1115/1.4039302.
- J88. O'Shields, S., **Summers, J.**, (2018), "Collaborative Design Between Industry Practitioners: An Interview-Based Study", *International Journal of Engineering Education*, **34 (2B)**, pp. 824-832, ISSN: 0949-149X/91.
- J87. Gill, A., **Summers, J.**, Turner, C., (2017), "Comparing Function-Structures and Pruned Function-Structures for Product Performance Prediction: An Approach to Benchmarking Representation Value", *Artificial Intelligence for Engineering Design, Analysis and Manufacturing*, **31 (4)**, pp. 535-549. doi: 10.1017/S0890060417000543.
- J86. Bohm, M., Eckert, C., Sen, C., Srinivasan, V., **Summers, J.**, Vermaas, P., (2017), "Thoughts on Benchmarking of Function Modeling: Why and How", *Artificial Intelligence for Engineering Design, Analysis, and Manufacturing*, **31 (4)**, pp. 393-400. doi: 10.1017/S0890060417000531.
- J85. Patel, A., Andrews, P., **Summers, J.**, Harrison, E., Schulte, J., Mears, M., (2017), "Evaluating the Use of Artificial Neural Networks and Graph Complexity to Predict Automotive Assembly Quality Defects", *ASME Transactions: Journal of Computing and Information Science in Engineering*, **17 (3)** pp. 031017.
- J84. **Summers, J.**, Eckert, C., Goel, A., (2017), "Function in Engineering: Benchmarking Representations and Models", *Artificial Intelligence for Engineering Design, Analysis and Manufacturing*, **31 (4)** pp. 401-12. doi: 10.1017/S0890060417000476.
- J83. Visotsky, D., Patel, A., **Summers, J.**, (2017), "Using Design Requirements for Environmental Assessment of Products: A Historical Based Method", *Procedia CIRP*, **66**, pp. 69-74.
- J82. Shankar, P., Phelan, K., **Summers, J.**, (2017), "A Verification and Validation Planning Method to Address Change Propagation Effects in Engineering Design and Manufacturing", *CERA Journal*, **25 (2)**, pp. 151-62, doi: 10.1177/1063293X16671771.
- J81. Mochida, S., Righter, J., **Summers, J.**, (2016), "A Study of Project Cost Management Based on the Requirements Analysis", *International Journal of Biomedical Soft Computing and Human Sciences*, **21 (1)**, pp. 21-27. (ISSN 1345-1529)
- J80. Mathieson, J., **Summers, J.**, (2017), "Modeling and Tracking Engineering Design Process through Structural Complexity Metrics and Artificial Neural Network Training", *CERA Journal*, **25 (2)**, pp. 108-22, doi: 10.1177/1063293X16666936.
- J79. Thimmaiah, S., Phelan, K., **Summers, J.**, (2017), "An Experimental Study on the Influence that Failure Number, Specialization, and Control have on Confidence in Predicting System Failures", *Journal of Mechanical Design*, **139 (1)**, pp. 011102-011102-12. doi:10.1115/1.4034789.
- J78. Phelan, K., Pearce, B., **Summers, J.**, Kurz, M., (2017), "Supporting Vehicle Option Change Management through a Graph Based Visualization Tool", *Journal of Computing and Information Science in Engineering*, **17 (1)**, pp. 011004-011004-15. doi: 10.1115/1.4034472. .
- J77. Phelan, K., Wilson, C., Pearce, B., **Summers, J.**, Kurz, M., Schulte, J., Knackstedt, S., (2017), "Configuration and Options Management Processes and Tools: An Automotive OEM Case Study", *Journal of Manufacturing Technology Management*, **28 (2)**, pp. 146-168, doi: 10.1108/JMTM-09-2015-0079.
- J76. Gill, A., Visotsky, D., Mears, L., **Summers, J.**, (2017), "Cost Estimation Model for PAN Based Carbon Fiber Manufacturing Process", *ASME Journal of Manufacturing Science and Engineering*, **139 (4)**, pp. 041011-041011-8. doi:10.1115/1.4034713.
- J75. Salmi, A., David, P., Blanco, E., **Summers, J.**, (2016), "A Review of Cost Estimation Models for Assembly Automation Level", *Computers & Industrial Engineering*, **98 (August)**, pp. 246-59, doi: 10.106/j.cie/2016.06.007.
- J74. Sridhar, S., Fazelpour, M., Gill, A., **Summers, J.**, (2016), "Precision Analysis of the Graph Complexity Connectivity Method: Assembly and Function Model", *Procedia CIRP*, **44**, pp., 163-8, doi:10.1016/j.procir.2016.02.029.
- J73. Pearce, B., Phelan, K., Kurz, M., **Summers, J.**, Schulte, J., Dieminger, W., Funk, K., (2016), "Configuration Management through Satisfiability", *Procedia CIRP*, **44**, pp. 204-9, doi:10.1016/j.procir.2016.02.127.



- J72. Renu, R., Vitosky, D., Knackstedt, S., Mocko, G., **Summers, J.** (2016), "A Knowledge Based FMEA to Support Identification and Management of Vehicle Flexible Parts Issues", *Procedia CIRP*, **44**, pp. 157-62, doi:10.1016/j.procir.2016.02.112.
- J71. Fazelpour, M., Shankar, P., **Summers, J.**, (2015), "Comparative Study of Optimization Techniques in Sizing Meso-Structures for Use in Non-Pneumatic Tires", *Journal of Computing and Information Science in Engineering*, **15** (4), doi:10.1115/1.4031828.
- J70. Joshi, S., **Summers, J.**, (2015), "Requirements Change: Understanding the type of changes in the requirements document of novice designers", *International Journal of Mechanical Engineering Education*, **43** (4), pp. 286-304, DOI:10.1177/0306419015612348.
- J69. Berglind, L., Ju, J., **Summers, J.**, (2015), "Shape Control of a Beam Consisting of Triangular Meso-Structure Segments with Multiple V-shaped Flexure Springs", *International Journal of Mechanisms and Robotic Systems*, **2** (2), 144-68, DOI: 10.1504/IJMRS.2015.069030.
- J68. Griese, D., **Summers, J.**, Thompson, L., (2015), "The Effect of Honeycomb Core Geometry on the Sound Transmission Performance of Sandwich Panels", *ASME Journal of Vibrations and Acoustics*, **137** (2), doi:10.1115/1.4029043.
- J67. Worinkeng, E., Joshi, S., **Summers, J.**, (2015), "An experimental study: analyzing requirement type influence on novelty and variety of generated solutions", *International Journal of Design Creativity and Innovation*, **3** (2), pp. 61-77, doi: 10.1080/21650349.2014.909294.
- J66. Salmi, A., David, P., **Summers, J.**, Blanco, E., (2014), "A Modeling Language for Assembly Sequences Representation, Scheduling, and Analyses" *International Journal of Production Research*, **52** (13), pp. 3986-4006.
- J65. Veeramurthy, M., Ju, J., Thompson, L., **Summers, J.**, (2014), "Optimization of Geometry and Material Properties of a Non-Pneumatic Tire for Reducing Rolling Resistance", *International Journal of Vehicle Design*, **66** (2) pp. 193-216.
- J64. Morkos, B., Mathieson, J., **Summers, J.**, (2014), "Comparative Analysis of Requirements Change Prediction Models: Manual, Linguistic, and Neural Network", *Research in Engineering Design*, **25** (2), pp 139-56, doi: 10.1007/s00163-014-0170-z.
- J63. Namouz, E., **Summers, J.**, (2014), "Comparison of Graph Generation Methods for Structural Complexity Based Assembly Time Estimation", *Journal of Computing and Information Science in Engineering*, **14** (2), pp. 021003-021003-9, doi: 10.1115/1.4026293.
- J62. Morkos, B., **Summers, J.**, Thoe, S., (2014), "A Comparative Survey of Domestic and International Experiences in Capstone Design", *International Journal of Engineering Education*, **30** (1), pp. 79-90.
- J61. Miller, M., **Summers, J.**, Mathieson, J., Mocko, G., (2014), "Manufacturing Assembly Time Estimation Using Structural Complexity Metric Trained Artificial Neural Networks", *ASME Journal of Computing and Information Science in Engineering*, **14** (1), pp. 011005-011005-10, doi:10.1115/1.4025808.
- C136
- J60. Owensby, J., **Summers, J.**, (2014), "Assembly Time Estimation: Assembly Mate Based Structural Complexity Metric Predictive Modeling", *ASME Journal of Computing and Information Science in Engineering*, **14** (1), pp. 011004-011004-12, doi:10.1115/1.4025808.
- J59. Srirangam, M., Anandan, S., **Summers, J.**, (2014), "Development of a Geometric Model Retrieval System: A Comparative Case Study", *International Journal of Computer Aided Engineering Technology*, **6** (2), pp. 113-38. DOI: 10.1504/IJCAET.2014.060295.
- J58. Miller, W., **Summers, J.**, (2013), "Investigating the use of design methods by capstone design students at Clemson University", *International Journal of Technology and Design Education*, **23** (4), pp. 1079-91, DOI: 10.1007/s10798-012-9227-3.
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- T12. **Summers, J.**, (2004), "Algorithm for Complexity Connectivity", *Technical Report*, Clemson Research in Engineering Design and Optimization Lab, Clemson University, Clemson, SC, CREDO/AID/complexity/04-01 (July 2004)
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- T9. Danker, J., **Summers, J.**, (2002), "Design Exemplars and Gear Design", Clemson Research in Engineering Design and Optimization Lab, Clemson University, Clemson, SC, CREDO/AID/CAD/02-02 (August 2002)
- T8. Berthod, B., **Summers, J.**, (2002), "Implementation of the CADShell on the PocketPC", Clemson Research in Engineering Design and Optimization Lab, Clemson University, Clemson, SC, CREDO/AID/CAD/02-01 (August 2002)
- T7. **Summers, J.**, Shah, J., (2001), "The Design Exemplar: A New Data Structure for Design Automation", *Technical Report*, Arizona State University, Tempe, AZ, ASU/DAL/exemplar/01-9 (December 2001)
- T6. **Summers, J.**, Shah, J., (2000), "Exemplar Representation and Networking", *Technical Report*, Design Automation Laboratory, Arizona State University, Tempe, AZ, ASU/DAL/exemplar/00-6 (February 2000)
- T5. **Summers, J.**, Shah, J., (2000), "Survey of Embodiment Design", *Technical Report*, Design Automation Laboratory, Arizona State University, Tempe, AZ, ASU/DAL/exemplar/00-5 (February 2000)
- T4. Kulkarni, S., **Summers, J.**, (1999), "Influence of Method Variables on the C-Sketch Method – An Experimental Study", *Technical Report*, Design Automation Laboratory, Arizona State University, Tempe, AZ, ASU/DAL/IG/99-9 (December 1999)

- T3. **Summers, J.**, (1999), "Development of Leadership Style Selection Rules for Agent Architecture in Engineering Design", *Technical Report*, Design Automation Laboratory, Arizona State University, Tempe, AZ, ASU/DAL/Agents/99-6, (May 1999)
- T2. **Summers, J.**, (1998), "Feature Based Design in a Virtual Environment for Early Stage Submarine Design", *Masters' Thesis*, University of Missouri-Columbia, Mechanical and Aerospace Engineering, Columbia, MO.
- T1. **Summers, J.**, Butler, A., (1996), "A Feasibility Study: The Heating and Drying of Coal Particles Using Fluidized Bed Technology", *Technical Report*, University of Missouri-Columbia, Capsule Pipeline Research Center, CPRC Report No. 96-2 (September 1996)

### **Essays**

- E4. **Summers, J.**, (2014), "Applied Engineering Service Learning – Design and Build of Manufacturing Equipment for Elementary Classrooms", *Clemson Collaborations in Service-Learning*, Clemson University, ed. Kathy Woodward, vol. 2013-2014, pp. [\(http://www.clemson.edu/public/servicealliance/\)](http://www.clemson.edu/public/servicealliance/)
- E3. **Summers, J.**, (2012), "Applied Engineering Service Learning – Design and Build Wind Tunnels for Elementary Classrooms", *Clemson Collaborations in Service-Learning*, Clemson University, ed. Kathy Woodward, vol. 2011-2012, pp. 5-8. [\(http://www.clemson.edu/public/servicealliance/\)](http://www.clemson.edu/public/servicealliance/)
- E2. **Summers, J.**, (2012), "Who is our Community? Service Learning Can Include Company Sponsored Projects", *Clemson Collaborations in Service-Learning*, Clemson University, ed. Kathy Woodward, vol. 2011-2012, pp. 25-28. [\(http://www.clemson.edu/public/servicealliance/\)](http://www.clemson.edu/public/servicealliance/)
- E1. Saylor, J., **Summers, J.**, Mocko, G., (2012), "A New Take on the Research Funding Debate", *Physics and Society*, American Physical Society, vol. 2012, no. October, <http://www.aps.org/units/fps/newsletters/201210/saylor.cfm>

### **PATENTS AND INVENTION DISCLOSURES**

#### **Patents**

- P1. **Summers, J.**, Fadel, G., Ju, J., Ziegert, J., (2013), "Shear Compliant Hexagonal Meso-Structures Having High Shear Strength and High Shear Strain", US Patent No. 8,609,220, Issued December 17, 2013 (Michelin is assignee).
- P2. Shankar, P., Michaelraj, A., Ju, J., **Summers, J.**, Ziegert, J., Fadel, G., (2014), "Honeycomb Structures for High Shear Flexure", US Patent No. 8,651,156, Issued February 18, 2014 (Michelin is assignee).
- P3. Ju, J., Berglind, L., **Summers, J.**, (2014), "Method to Design Shear Flexible Structures", US Patent No. 8,688,421, Filed October 6, 2011, Issued April 1, 2014 (Michelin is assignee).
- P4. **Summers, J.**, Kolla, A., Ju, J., Ziegert, J., (2015), "Chiral Honeycomb Meso-Structures for Shear Flexure", US Patent No. 8,999,480, Issued April 7, 2015 (Michelin is assignee).

#### **Applications**

- Pa1. Curran, T., **Summers, J.**, (2014), "Heated Drinking Mug Using Wireless Power Transfer", Provision Patent Filed, March 10, 2014 (Clemson is assignee).

#### **Invention Disclosures**

- ID1. Matthews, J., **Summers, J.**, Stowe, D., Thompson, B., Liebersbach, R., (2007), "Helical Isolator Tweel: A Low-Temperature, Long-Life, Compliant Wheel for the Lunar Surface and Beyond", New Technology Report #45601, submitted to JPL in September 2007.
- ID2. Johnston, P., Smith, E., **Summers, J.**, (2007), "Mobile Baling System for Recyclables", Invention Disclosure, submitted to Clemson University in November 2007.
- ID3. Duddukuri, S., Hodges, J., Maier, J., Mears, L., Miller, S., **Summers, J.**, Yaski, S., (2007), "An Apparatus to Simulate the Effects of High-G Deceleration on Mechanical Models to Study Viscous-Solid Interfaces", Invention Disclosure, submitted to Clemson University in November 2007.
- ID4. Duddukuri, S., Hodges, J., Maier, J., Mears, L., Miller, S., **Summers, J.**, Yaski, S., (2007), "An Apparatus to Pack Soil into Testing Samples", Invention Disclosure, submitted to Clemson University in November 2007.

- ID5. Duddukuri, S., Hodges, J., Maier, J., Mears, L., Miller, S., **Summers, J.**, Yaski, S., (2008), "An Apparatus to Detect Small Changes in Mass at High G's", Invention Disclosure, submitted to Clemson University in November 2007.
- ID6. Teegavarapu, S., Shankar, P., Michealraj, A., Morkos, B., Kanda, A., **Summers, J.**, (2008), "Method for Integrating Thermal Cooling and Structural Support through Metal Foams", Invention Disclosure, presented to Clemson University in October 2008.
- ID7. Berglind, L., Ju, J., **Summers, J.**, (2009), "Method to Design Honeycomb Structures for Shear Stiffness and Shear Compliance", Invention Disclosure presented to Clemson University in August 2009.
- ID8. Berglind, L., Ziegert, J., **Summers, J.**, Joshi, S., (2009), "Piecewise Honeycomb Structure Design", Invention Disclosure presented to Clemson University in August 2009.
- ID9. Joseph, P., Ananthasayanam, B., **Summers, J.**, Blouin, V., Thompson, B., (2009), "A Method to Influence Traction Through Varying Contact Pressure in Discrete Shearbands for Tweel", Invention Disclosure presented to Clemson University in August 2009.
- ID10. Berglind, L., Ju, J., **Summers, J.**, (2009), "Honeycomb Embedded Airfoil for Morphing Shape", Invention Disclosure presented to Clemson University in August 2009.
- ID11. Berglind, L., **Summers, J.**, (2010), "Method for the Design of 2D Shape Morphing Skin Structures", Invention Disclosure submitted to Clemson University, June 2010.
- ID12. **Summers, J.**, Hancock, T., Julian, M., Kolla, A., Blouin, V., Joseph, P., (2010), "Concave Lateral Tread Profile for Improved Traction", Invention Disclosure submitted to Clemson University, June 2010.
- ID13. Ju, J., **Summers, J.**, (2011), "Porous, Composite Reinforced PU for Shear Band", Invention Disclosure submitted to Clemson University, May 2011.
- ID14. **Summers, J.**, Griese, D., (2011), "Design of Cellular Meta-Materials for Targeted Acoustic Properties", Invention Disclosure submitted to Clemson University, June 2011.
- ID15. Shankar, P., **Summers, J.**, (2011), "Invention of 'O'-Type Meso-structure for High Shear Flexure", Invention Disclosure submitted to Clemson University, November 2011.
- ID16. Curran, T., **Summers, J.**, (2013), "Wireless Powered Portable Personal Beverage Heater", Invention Disclosure submitted to Clemson University, November 2013.
- ID17. **Summers, J.**, Choi, H., Jaradat, M., (2014), "

## PRESENTATIONS

### Invited

- Summers, J.**, (2017), "Complexity in Engineering Manufacturing and Design: What is it, how can we measure it, and how can we use these measures to guide design?", invited talk, Department of Aerospace and Mechanical Engineering, University of Arizona, Tucson, AZ, November 2017, (invited by Prof. Anthony Muscat).
- Summers, J.**, (2017), "Demystifying Graduate School", invited talk, Department of Engineering, James Madison University, Harrisonburg, VA, February 2017, (invited by Prof. Robert Nagel).
- Summers, J.**, (2016), "Design Innovation and (Sustainable) Development", keynote address, International Conference on Innovations, Trade, and Development, Punjabi University, Patiala, Punjab, India, November 2016, (invited by Prof. Lakhwinder Singh).
- Summers, J.**, (2016), "Complexity in Engineering Design: How can we use these measures to guide design?", Data Driven Design Symposium, University of Maryland, College Park, MD, October 14, 2016 (invited by Prof. Mark Fuge of UMD).
- Summers, J.**, (2016), "Product Test and Validation", CTO Forum, Half Moon Bay, CA, August 12, 2016 (invited by Basheer Janjua, CTO Forum President).
- Summers, J.**, (2015), "Design: Meso-Structures", Goodyear, Akron, OH, September 2, 2015 (invited by Surendra Chawla, Innovation Lead).
- Summers, J.**, (2015), "Complexity in Engineering Manufacturing and Design: What is it, how can we measure it, and how can we use these measures to guide design?", Engineering Product Design Pillar, Singapore University of Technology and Design, Singapore, April 14, 2015 (invited by Kris Wood, Pillar Head).

- Summers, J.**, (2014), "Complexity in Engineering Manufacturing and Design: What is it, how can we measure it, and how can we use these measures to guide design?", Department of Mechanical Engineering, University of Louisville, Louisville, KY, October 27, 2014 (invited by Kevin Murphy, Department Chair).
- Summers, J.**, (2013), "Engineering Graphs to Complexity Metric Vectors to Surrogate Model Predictors: Discovering Implicit Knowledge", *26<sup>th</sup> European Conference on Operations Research*, Rome, Italy, July 2013.
- Summers, J.**, (2013), "Engineering Fiction: What if We Can Do Physics Reasoning on Product Functionality?", Department of Philosophy, TU-Delft, Delft, The Netherlands, April 22, 2013. (invited by Dr. Pieter Vermaas)
- Summers, J.**, (2013), "Complexity in Engineering Design", The Design Group, The Open University, Milton Keynes, UK, March 6, 2013. (invited by Prof. Claudia Eckert)
- Summers, J.** (2013), "Design Research", Institute of Product Engineering, Karlsruhe Institute of Technology, Karlsruhe, Germany, February 15, 2013. (invited by Prof. Albert Albers)
- Summers, J.** (2013), "Design Research", G-SCOP Laboratory, INP-Grenoble, Grenoble, France, September 18, 2012. (invited by Prof. Jean-Francois Boujut)
- Summers, J.**, (2007), "Design Enabling Tool Research", Creative Design Institute, Sungkyunkwan University, November 22, 2007. (invited by Prof. Yong-Se Kim)
- Summers, J.**, (2006), "Introduction of Design Enabling Tools - Development, Validation, and Lessons Learned", Interdisciplinary Workshop on Innovation, Creativity and Design, University of Texas-Austin, December 8, 2006, (Invited by Prof. Kris Wood).
- Summers, J.**, (2006), "Design Enabler Synthesis (DESYN): A Foundation and the Future", Mechanical Engineering Colloquium, WPI, March 24, 2006. (invited by Prof. Bob Norton)
- Summers, J.**, (2002), "Case-Based Design Facilitated by the Design Exemplar: Retrieval, Archival, and Representation for Mechanical Engineering Knowledge", Mechanical Engineering-Engineering Mechanics Graduate Seminar, Michigan Technological University, October 31, 2002. (invited by Assistant Professor Bernie Bettig)
- Summers, J.**, (2001), "The Design Exemplar: A Query Mechanism for Characteristic Interrogation", School of Mechanical Engineering, Georgia Institute of Technology, Atlanta, GA (June 2001)
- Summers, J.**, (2001), "Bits and Bytes, Numbers and Arrays", Guest Lecture CEE4803C, School of Mechanical Engineering, Georgia Institute of Technology, Atlanta, GA (June 2001)
- Summers, J.**, (2001), "Development of Domain and Solver Independent Method for Mechanical Engineering Embodiment Design",
- Department of Mechanical Engineering, Iowa State University, Ames, IA (March 2001)
  - Department of Mechanical Engineering, University of Kansas, Lawrence, KS (April 2001)
  - Department of Mechanical Engineering, University of Missouri-Rolla, Rolla, MO (May 2001)
  - Department of Mechanical Engineering, Clemson University, Clemson, SC (May 2001)

### **Workshops**

- Summers, J.**, Eckert, C., (2015), "Benchmarking Functional Models", *International Conference on Engineering Design 2015*, Workshop, Milan, Italy, July, 2015. (two days; 12 participants)
- Summers, J.**, Eckert, C., (2014), "Benchmarking Functional Models", *ASME 204 International Design Engineering Technical Conference and Computers and Information in Engineering Conference*, Workshop, Buffalo, NY, Aug. 16, 2014. (4 hours; 25 participants)
- Eckert, C., **Summers, J.**, (2014), "Benchmarking Functional Models", *Design Cognition and Computing Conference*, London, UK, (4 hours; 12 participants)
- Summers, J.**, Eckert, C., (2013), "Design Research Methods: Interviewing", *ASME 2013 International Design Engineering Technical Conference and Computers and Information in Engineering Conference*, Workshop #1, Portland, OR, Aug. 4, 2013. (4 hours; ~50 participants)

### **HONORS AND AWARDS**

#### **International/National**

- Kos Ishii-Toshiba DFMLC Award, 2018. Selected for "sustained and meritorious contributions to design for manufacturing and the life cycle". This is a Design Engineering Division ASME Award, overseen



by the Design for Manufacturing and Life Cycle Technical Committee. Average years between PHD and award is ~20. (\$1500 honorarium).

Elected Fellow to ASME, 2012. Elected Fellow to the largest and oldest professional association of mechanical engineers. This election is done by a panel of senior Fellow members within the Society and is based on significant contributions in research, education, and service. Of the 110,000 members, only about 3,000 are elected to the Fellow status, less than 3%.

JPL ICB Patent Award, 2012, This Award is presented for significant efforts that have resulted in patentable materials as they relate to work supported by NASA and JPL. The award is given by the Innovative Technology Assets Management Office of JPL. This award was for NPO 45601: Elastic Shear Band with Helical Coils (\$500 honorarium).

Arch T. Colwell Merit Award, 2011, This Award was established by Arch T. Colwell to recognize authors of outstanding papers presented at SAE meetings. Papers are judged for their value as contributions to existing knowledge of mobility engineering, and primarily with respect to their value as an original contribution to the subject matter. This award was for a 2009 SAE World Congress and Exposition paper submitted and presented (C61 and J21)

TMCE Outstanding Contribution Award, 2010, International award given to outstanding research contribution to the field of design presented annually to one conference participant. This award is given in lieu of a best paper award at the international conference (approximately 270 attendees with an acceptance rate at the conference below 50%).

SAE Ralph Teetor Award, 2009, International award for undergraduate teaching as presented to eight junior faculty every year

Appreciation Award, 2007 Changwon International Capstone Design Fair, advised senior design project that was selected as one of seven from the US to be presented at an international fair in South Korea (2007).

Appreciation Award, 2006 Taegu International Capstone Design Fair, advised senior design project that was selected as one of six from the US to be presented at an international fair in South Korea (2006).

### **State/Regional**

SC Commission on Higher Education Service-Learning Award, 2014, Nominated by President of Clemson University for the award based on outreach and service learning as integrated in the ME 4010 class, specifically focused on the elementary school outreach design program for manufacturing equipment (Fall 2013).

SC Governor's Award for Science Awareness, 2012, Received Award April 2012; Nominated by the Vice President of Research of Clemson University for the award based on outreach, service learning, and industry integration in the undergraduate and graduate education programs. The award was specifically focused on the elementary school outreach program in designing and building wind tunnels as part of the ME 401 class (Spring 2011 and Fall 2011).

Innovision 2011, Received Award December 2011; Industry selected finalist for the Innovation in Education Award based on the Service Learning program with ME 401 (wind tunnels in elementary schools) (2011)

Innovision 2006, Received Award December 2006; Industry selected recipient of the Innovation in Education Award based on the Maymester Product Innovation class (2006)

### **University**

College of Engineering, Computing and Applied Sciences: Faculty Mentoring Award, 2018, Awarded for distinguished efforts in mentoring faculty.

College of Engineering and Science: Esin Gulari Leadership Award, 2015, Awarded for service to the College and University

Clemson University Board of Trustees Award for Faculty Excellence, 2012, For exceptional achievement in teaching, research, service, or advising that has earned official recognition from students, peers, and colleagues.

Frank A. Burtner Award for Excellence in Advising, 2012, Received Award May 2012; Nominated by E. Namouz and other CEDAR students for outstanding efforts in advising both graduate and undergraduate students at Clemson University

Clemson University Board of Trustees Award for Faculty Excellence, 2011, For exceptional achievement in teaching, research, service, or advising that has earned official recognition from students, peers, and colleagues.

College of Engineering and Science *Innovation and Discovery in Engineering and Science Professorship* – IDEaS Professor, 2010-2013. Awarded the inaugural named professor in the college for recognition of exemplary collaboration and innovation in research and educational activities. The professorship carries with it an unrestricted account of \$20,000 annually.

Clemson University Board of Trustees Award for Faculty Excellence, 2009, For exceptional achievement in teaching, research, service, or advising that has earned official recognition from students, peers, and colleagues.

### **Pre-Professional Awards**

NSF Design Essay Competition Award – Graduate Division, DTM Committee, ASME (2000)

Preparing Future Faculty Fellowship, Arizona State University (2001-2002)

Regent's Scholar, Arizona State University (1999-2001)

Curators Scholar, University of Missouri (1991-1992)

Bright Flight Scholar, University of Missouri (1991-1996)

Undergraduate Engineering Award, Missouri Society of Professional Engineers (1991)

Undergraduate Engineering Award, College of Engineering – University of Missouri (1991-1993)

Undergraduate Physics Award, University of Missouri (1992)

D. Wollersheim Mechanical Engineering Scholar, University of Missouri (1992)

Thompson Physics Scholar, University of Missouri (1992)

### **Student Advisee Awards**

2016 ASME NSF Design Essay Awardee:

2015 ASME NSF Design Essay Awardee:

2014 Student Travel Grant for International Capstone Design Conference (Columbus, OH): MS Student **Steven O'Shields** (\$500).

2014 ASME CIE Division Best Dissertation Award: PHD Student **Beshoy Morkos**. US Recipient. Award given based on review of dissertation by CIE Executive Committee and by contributions to CIE as evidenced through publication in CIE Conference and other venues (\$500).

2014 DFMLC Scholar: PHD Student **Keith Phelan**. Inaugural recipient of Design for Manufacturing and Life Cycle Technical Committee Award to promote mentorship and professional growth (\$1000).

2014 ASME-NSF Design Essay Awardee: PHD Student **Mohammad Fazelpour** and **Rohan Desai**. One of ten students internationally to receive the award and the accompanying travel fellowship to Buffalo, NY conference (\$1250).

2014 ASME-NSF Design Essay Awardee: MS Student **Tyler Curran**. One of ten students internationally to receive the award and the accompanying travel fellowship to Buffalo, NY conference (\$1250).

2013 ASME CIE Division Best Dissertation Award: PHD Student **Chiradeep Sen**. Inaugural recipient. Award given based on review of dissertation by CIE Executive Committee and by contributions to CIE as evidenced through publication in CIE Conference and other venues (\$500).

2013 NIST CIE DETC Graduate Poster Awardee: PHD Student **Mohammad Fazelpour**. One of eight students internationally to receive the award and the accompanying travel fellowship to Portland, OR conference (\$1000).

2012 Student Travel Grant for International Capstone Design Conference (Champaign-Urbana, IL): MS Student **Shraddha Joshi** (\$500).

2012 ME Graduate Student Research: MS Student **David Griesse**. Inaugural recipient of Eastman Graduate Research Award based on poster and presentation review by faculty within ME Department (\$2000).

2011 NIST CIE DETC Graduate Poster Awardee: MS Student **J. Eric Owensby**. One of six students internationally to receive the award and the accompanying travel fellowship to Washington, DC conference (\$1000).

2011 Leadership in Academia Workshop Travel Grant: PHD Student **Shraddha Joshi**. One of twenty grantees to travel to Washington DC for this NSF support workshop (\$1250).

- 2011 Student Travel Fellowship for Mudd Design Workshop VIII: PHD Student **Shraddha Joshi**. One of ten international graduate fellows (\$1000).
- 2010 SC Space Grant Consortium Graduate Fellowship: MS Student **James Mathieson**. One of six statewide graduate fellows (\$14000).
- 2010 Student Travel Grant for International Capstone Design Conference (Boulder, CO): MS Student **Shraddha Joshi** (\$500).
- 2010 ME Teaching Fellowship: PHD Student **Chiradeep Sen**. One of three teaching fellows selected annually in the ME Department to shadow faculty and then teach undergraduate courses.
- 2009 ASME-CAPPD Graduate Poster Awardee: PHD Student **Chiradeep Sen**. One of three graduate students selected to present their poster at the ASME CIE Conference. Includes a travel grant.
- 2009 ASME-NSF Design Essay Awardee: MS Students **Jay Richardson** and **Essam Namouz**. One of eight teams of students to win the award and the accompanying travel grant.
- 2009 ASME-NSF Design Essay Awardee: MS Student **James Mathieson** and PHD Student **Beshoy Morkos**. One of eight teams of students to win the award and the accompanying travel grant.
- 2009 NIST CIE DETC Graduate Poster Awardee: PHD Student **Beshoy Morkos**. One of three students awarded the travel grant.
- 2009 ASME Teaching Fellowship Awardee: PHD Student **Beshoy Morkos**. One of two students nationally to receive the Teaching Fellowship (renewable for two years).
- 2008 ASME-NSF Design Essay Awardee: PHD Student **Prabhu Shankar**. One of nine graduate students internationally to receive the award and the accompanying travel stipend to the ASME DETC Conference in Brooklyn, NY.
- 2007 ASME-NSF Design Essay Awardee: PHD Student **Chiradeep Sen**. One of eight graduate students internationally to receive the award and the accompanying travel stipend to the ASME DETC Conference in Las Vegas, NV.
- 2007 ASME-NSF Design Essay Awardee: PHD Student **Beshoy Morkos**. One of eight graduate students internationally to receive the award and the accompanying travel stipend to the ASME DETC Conference in Las Vegas, NV.
- 2007 SC Space Grant Consortium Graduate Fellowship: MS Student **David Stowe**. One of three statewide graduate fellows.
- 2007 SC Space Grant Consortium Undergraduate Scholarship: UG Student **Kyle Conger**. One of five statewide undergraduate scholarship recipients.
- 2006 NSF Design Conference Essay Awardee: PHD Student **Srinivasan Anandan**. One of twelve graduate students nationally to receive the award and the accompanying travel stipend to the NSF Grantee's Conference in St. Louis, MO.
- 2006 ASME-NSF Design Essay Awardee: PHD Student **Sudhakar Teegavarapu**. One of eight graduate students internationally to receive the award and the accompanying travel stipend to the ASME DETC Conference in Philadelphia, PA.
- 2006 Taegu International Capstone Design Fair: **Beshoy Morkos, David Stowe, Madhu Kayyar**. Student design team members on Lunar Tweel Project that was presented at the fair, one of eight from the US, Taegu, South Korea. (Project team was supervised by **Joshua D. Summers**).
- 2005 ASME-NSF Design Essay Awardee: MS Student **Shashidhar Putti**. One of eight graduate students internationally to receive the award and the accompanying travel stipend to the ASME DETC Conference in Salt Lake City, UT.
- 2005 ASME-NSF Design Essay Awardee: PHD Student **Sudhakar Teegavarapu**. One of eight graduate students internationally to receive the award and the accompanying travel stipend to the ASME DETC Conference in Salt Lake City, UT.

## SPONSORED RESEARCH

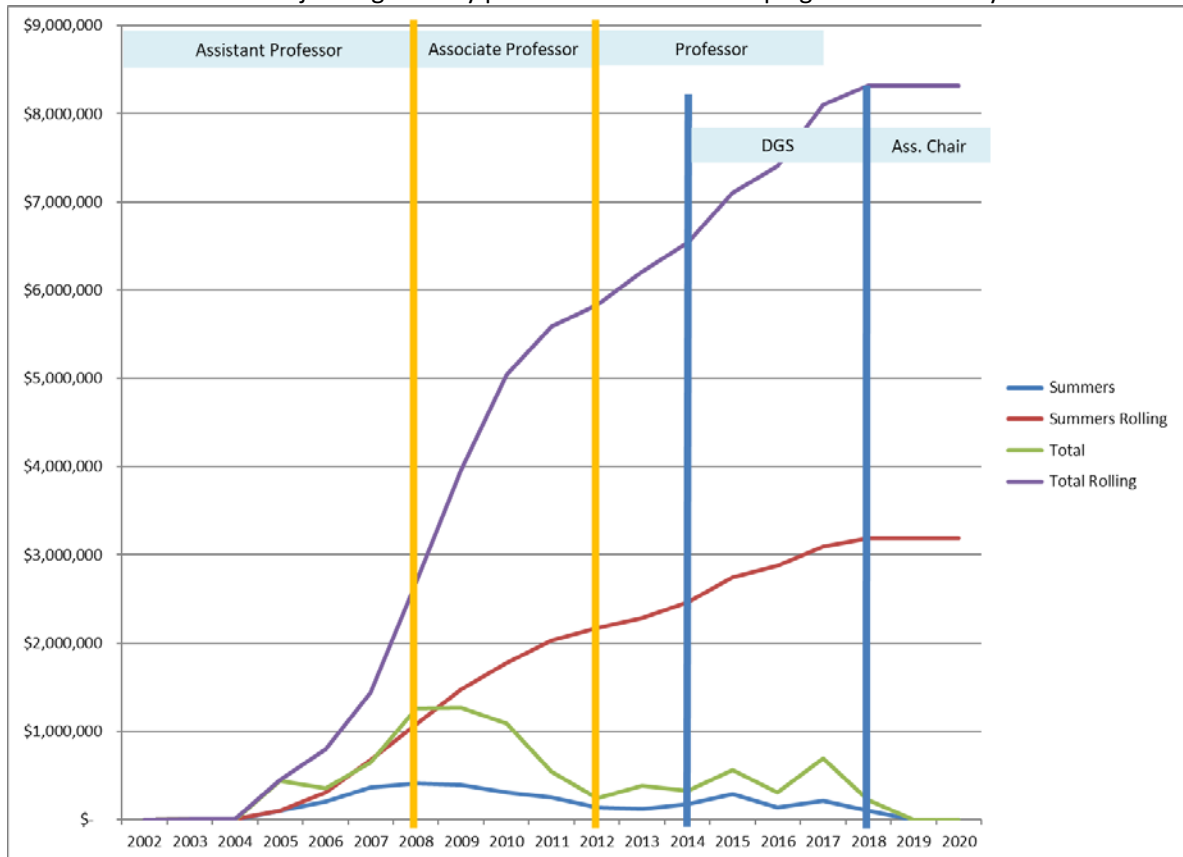
Total Cumulative Sponsored Research Funding: \$18,054,409 (Summers' Portion: \$4,207,732)

Total "Other" Sponsored Funding: \$375,300 (Summers' Portion: \$365,300)

Total Combined Funding: \$12.1M (Summers' Portion: \$3.9M)

*Summers' initial start-up (cash) = \$21,500. Assuming a typical 30% effective overhead on the total project with 20% of that is returned to Department, the total return to the department on the start-up investment is greater than 11.7X in 17 years.*

The figure illustrates the funding trends with project totals distributed as expenditures. The vertical lines delineate major stages in my professional career. Graph generated in May 2018.



### Current

Active Funding: \$10,795,432 (Summers' Portion: \$1,488,304)

- Jones, R., Atamturktur, S., Granberg, E., Winslow, S., Rosopa, P., (and others, **Summers, J.**), (2016), "ADVANCE Institutional Transformation at Clemson University", *NSF*, \$3,405,472 (1%), (Sept. 2016-Aug. 2021).
  - NOTE: added as a co-PI at 1% effort in Aug. 2018 (60% of project remaining). This is for activities as Senior Advocate. (adjusted = \$2,043,283 and Summers' adjusted = \$20,432)
- Kurz, M., Taaffe, K., **Summers, J.**, (2018), "Samsung Productivity Improvement", *Samsung*, \$286,000, (30%), (Sept. 2018-Aug. 2019).
- Kitchens, C., Boyer, D., Atamturktur, S., **Summers, J.**, Gramopadhye, A., (2018), "Collaborative Research: SPECTRA Student Pathways in Engineering and Computing for Transfers", *NSF*, \$4,277,149. (15%), (Sept. 2018-Aug. 2023) (pending final approval)
- Mears, L., Stanley, L., **Summers, J.**, Switzer, D., Apon, A., (2018), "NRT-HDR: Technology-Human Integrated Knowledge Education and Research (THINKER)", *NSF*, \$3,000,000. (6%), (Aug. 2018-Aug. 2023).
- Mears, M., **Summers, J.**, (2017), "OEE: Vehicle Assembly Center", BMW, \$150,000, (50%) (June 2017-June 2018), 0 PHD.
- Mears, M., **Summers, J.**, (2018), "Augmented Associate II", BMW, \$160,000, (50%) (May 2018-Dec. 2018), 2 PHD.
- Mears, M., **Summers, J.**, Mocko, G., (2017), "Augmented Associate", BMW, \$120,000, (30%) (May 2017-Dec. 2017), 2 PHD.

8. Shuffler, M., **Summers, J.**, (2017), "Mapping Teamwork Competency Acquisition and Transfer in the Engineering Design Curriculum: Metric Tool Development and Validation", Clemson University SEED Grant, \$10k, (50%). (July 2017-June 2018).
9. **Summers, J.**, (2017), "Workshop: Summer School on Methods for Case, Protocol, and Controlled Experiment Research on Design and Systems Engineering", National Science Foundation, \$49,870, (100%). (April 2017-Dec. 2017).
10. **Summers, J.**, Shuffler, M., (2015-2017), "NSF EAGER: Function Modeling, Reasoning, and Thinking – Mapping Behaviors to Cognitive Explanations", National Science Foundation, \$248,703 (50%) (Aug. 2015-Aug. 2017).
11. **Summers, J.**, (2015-2018), "Collaborative Research: Exploring Requirement Transiency: Measuring volatility through network models", National Science Foundation, \$190,000 (100%) (Aug. 2015-Aug. 2018). NOTE: collaborative project with B. Morkos (Florida Tech) for additional \$260,000 (non-Clemson funding)

### **Completed**

Completed Funding: \$7,258,977 (Summers' Portion: \$2,718,428)

1. Blouin, V., **Summers, J.**, (2016), "IFAI 2015: Meta-Modeling of Non-Certified Tents by Design of Experiments", Industrial Fabrics Association International, \$62,354, (50%) (May 2016-Dec. 2016), 2 MS.
2. **Summers, J.**, Wagner, J., (2016-2017), "TTi: Oil Pulse Driver Modeling", TTi, \$82,000, (50%). (September 2016-August 2017).
3. Mears, L., **Summers, J.**, Mocko, G., Mason, S., McGregor, J., McClendon, J., (2017), "Demonstration: Augmented Reality Based Vehicle Inspection", Department of Commerce, South Carolina, \$226,000, (10%). (Feb. 2017-Dec. 2017).
4. **Summers, J.**, Turner, C., Wagner, J., (2016), "SC Space Grant: Freight Farms/NASA STTR 2016: Thermal/Energy Controls Design and Optimization", SC Space Grant, \$10,000, (33%). (July 2016-Apr. 2017).
5. **Summers, J.**, Turner, C., Wagner, J., (2016-2017), "Freight Farms/NASA STTR 2016: Thermal/Energy Controls Design and Optimization", Freight Farms sub-contract from NASA, \$80,065, (33%), 2 PHD. (Aug. 2016-Aug. 2017).
6. Mocko, G., **Summers, J.**, (2015), "BMW 2015: Investigation of potential collisions of flexible car parts", BMW, \$106,000, (50%) (Jan. 2015 – Aug. 2015)
7. **Summers, J.**, Mears, L., (2014), "BMW 2015: Quality Prediction from Line Information and Assembly Graphs", BMW, \$151,000, (80%) (Sept. 2014 – Dec. 2015)
8. Mears, L., **Summers, J.**, (2014), "BMW 2015: SPC Quality Prediction from Line Information", BMW, \$132,000, (20%) (Sept. 2014 – Dec. 2015)
9. Kurz, M., **Summers, J.**, (2014), "BMW 2015: Configuration Management and Planning (Year 2)", BMW, \$115,000, (50%) (Aug. 2014 – Aug. 2015)
10. **Summers, J.**, (2015), "ProNova: Gantry Measurement System Design", ProNova, \$15,000 (100%).
11. **Summers, J.**, Wagner, J., (2014), "Design of Compressors for Noise Reduction", TTi, \$65,000, (50%) (Aug 2014-Aug 2015)
12. Thompson, L., **Summers, J.**, (2014), "Design and Characterization of Periodic Cellular Meta-Materials with Targeted Mechanical, Acoustic, and Effective Material Properties", SC Space Grant Consortium, \$18,741, (50%) (June 2014-June 2015)
13. Thompson, L., **Summers, J.**, (2014), "Design and Characterization of Periodic Cellular Meta-Materials with Targeted Mechanical and Effective Material Properties", ME Department SGER, \$15,000, (50%) (Jan 2014-Dec 2015).
14. **Summers, J.**, (2014), "Travel Scholarships for Graduate Students to attend PublishED 2014; Grenoble, France; February 2014", NSF, \$21,100, (100%) (Jan 2014-Dec 2014)
15. **Summers, J.**, Kurz, M., (2013), "BMW 2013: Configuration Management and Analysis", BMW, \$110,000, (50%) (Jul 2013-Jun 2014) 2 PHD
16. Mocko, G., Kurz, M., **Summers, J.**, Mears, L., (2013), "BMW 2013: Information in Manufacturing", BMW, \$291,052 (20%) (Jan. 2013-Dec. 2013) 5 PHD.

17. **Summers, J.**, Fadel, G., (2012-2013), "Computational Support to Develop a Verification and Validation Plan to Reduce Engineering Change Propagation in Vehicle Configuration Design", ARC, \$69,121 (90%) (Aug. 2012-July 2013) 1 PHD, 1 Post-Doc.
18. Mocko, G., **Summers, J.**, (2012), "BMW 2012: Formalization of the TVG Information and Manufacturing System", BMW, \$118,252 (50%) (Jan. 2012 – Jan. 2013) 3 PHD.
19. Rosen, D., **Summers, J.**, (2011), "Workshop on Mechanical Engineering Design Knowledge Modeling", NSF, \$47,314 (50%) (Aug. 2011).
20. Mocko, G., **Summers, J.**, (2011), "BMW 2011: Formalization of the TVG Information and Manufacturing System", BMW, \$110,000 (50%) (Jan. 2011 – Dec. 2011) 3 PHD.
21. Mocko, G., **Summers, J.**, (2011-2012), "JCI 2011: Design of Car Seat Mechanisms", JCI, \$86,000 (50%) (Jun 2011 – Jun 2012) 2 PHD (accepted by Sponsor, continuation of previous contract).
22. **Summers, J.**, (2011-2012), "Fellowship for James Mathieson – Dynamic Tracking of Design Project Complexity for Project Performance Prediction", SC Space Consortium, \$10,000, (100%) (Aug 2011 – Jul 2012) 1 PHD.
23. **Summers, J.**, (2012), "IFAI 2012: Continued Testing and Webtool Interface for Ballasting Studies", IFAI, \$5,000 (75%) (May 2012-Aug. 2012) 1 PHD, 1 MS.
24. **Summers, J.**, Blouin, V., (2011), "IFAI 2011: Testing and Performance Analysis of Tent Ballasts", IFAI, \$60,000 (50%) (May 2011 – Aug. 2011) 2 PHD.
25. **Summers, J.**, Joseph, P., Blouin, V., 2007, "SC NASA EPSCoR 2007: Development of a Lunar Capable Rover Tweel for a Modular Manned Rover System: Analytical and Experimental Research", NASA, \$1,470,000 (40%) (Oct. 2007 – Sep. 2011). 3 PHD; 1 Post-Doc. (No cost extension granted through Sept. 2011).
26. Ziegert, J., Mocko, G., **Summers, J.**, (2010), "Generation 2 Power Adjuster Concept Definition", Johnson Controls, \$68,670, (30%) (Apr. 2010-Oct. 2010). (No cost extension granted through June 2011)
27. **Summers, J.**, (2010-2011), "Fellowship for James Mathieson – Dynamic Tracking of Design Project Complexity for Project Performance Prediction", SC Space Consortium, \$10,000, (100%) (Aug 2010 – Jul 2011) 1 PHD.
28. Kurfess, T., **Summers, J.**, Ziegert, J., Fadel, G., Mears, L., Joseph, P., 2007, "Michelin 2007: Advanced Tweel Development: Meta-Materials Design, Analysis, and Manufacturing", Michelin (through NIST ATP), \$1,908,993 (19%) (Jan. 2008-Dec. 2010). 3 MS, 4 PHD, 2 Post-Doc.
29. **Summers, J.**, Mocko, G., (2009-2010), "BMW 2009: Phase 1: Lazy Part Demonstration", \$168,000 (50%) (Aug. 2009-Dec. 2010). 3 PHD.
30. **Summers, J.**, Hodges, L., (2009), "BMW 2009: Demonstration of Augmented Reality in Inspection", BMW, \$54,000 (50%) (Aug. 2009 – May 2010). 1 MS, 1 Post.
31. Mocko, G., **Summers, J.**, Ziegert, J., (2009), "BMW 2009: E70 Headliner Grab Handle Analysis", \$99,500 (30%) (Aug. 2009 – July 2010). 2 MS.
32. **Summers, J.**, Biggers, S., Joseph, P., 2008, "ARC 2008: Sand/Tire Traction Interaction Modeling", US TACOM, \$100,000 (35%) (May 2008-Dec. 2009). 2 PHD.
33. **Summers, J.**, Mocko, G., 2008-2009, "BMW 2008: Phase 0 Manufacturing Lightweight Engineering Program", BMW, \$159,000 (50%) (May 2008 – May 2009). 2 PHD, 1 Post-Doc.
34. **Summers, J.**, 2008-2009, "BMW 2008: Use of Mobile Devices in Manufacturing", BMW, \$34,000 (100%) (Oct. 2008 – Jul 2009). 1 PHD.
35. **Summers, J.**, 2008, "JPL 2008: IPP Thermal Chamber Test System Development", JPL, \$25,000 (100%) (Feb. 2008-Nov. 2008).
36. **Summers, J.**, Joseph, P., "SC Space Grant 2007: Design of a Lunar Tweel for JPL", South Carolina Space Grant Consortium, \$30,000, (50%) (May 2007 – Apr. 2008). 1 PHD.
37. **Summers, J.**, Joseph, P., 2007, "JPL 2007: Lunar Tweel Design for ATHLETE", Jet Propulsion Laboratory through Michelin, \$30,000 (50%) (May – Aug. 2007). 1 RA.
38. **Summers, J.**, Stowe, D., 2007, "Proposal for Exploratory Research and Development of a Non-pneumatic Wheel for Lunar Application on NASA's ATHLETE and LSAM Projects", SC Space Grant Consortium, \$10,000, (100%) (Aug. 2007 – July 2008). 1 MS.
39. **Summers, J.**, Mears, L., 2007, "Michelin 2007: Mud Fling Measurement System", Michelin, \$98,000, (50%) (May 2007 – Apr. 2008). 2 MS; 1 Post-Doc.

40. **Summers, J.**, Mears, L., 2008, "Michelin 2008: Mud Fling Measurement System – Continuation", Michelin, \$25,000, (50%) (May 2008 – June 2008).
41. **Summers, J.**, Mocko, G., 2006-2008, "Investigation in Rule-Based Design", Hartness International, \$82,925 (50%) (Aug. 2006 – Feb. 2008). 1 MS; 1 PHD
42. **Summers, J.**, 2007, "LED Headlight Integration Design Project", BMW Forschung und Technik GmbH, \$79,755 (100%), (Jan. 2007 – Dec. 2007). 2 PHD; 1 Post-Doc
43. **Summers, J.**, 2006-2007, "Exterior Lighting Integration Design Project", BMW Forschung und Technik GmbH, \$79,755 (100%), (Nov. 2006 – Nov. 2007). 2 PHD
44. **Summers, J.**, Blouin, V., 2006-2007, "Conceptual Development for Lunar Tweel Shear Band", Michelin, \$18,771 (15%) (August 2006 – July 2007).
45. **Summers, J.**, 2006, "Tweel Material Analysis", Michelin, \$6,000 (100%) (July 2006).
46. **Summers, J.**, 2006, "Computational Support for Semantic Information Modeling in Design", National Science Foundation, SGER DMI Engineering Design, \$49,999 (100%) (Aug. 2006 – Aug 2007). NOTE: collaborative proposal with B. Bettig (Michigan Tech) for additional \$50,000 (non Clemson).
47. **Summers, J.**, Biggers, S., 2006, "Technology Enhanced Design", Wright Metal Products, \$39,019 (50%) (Jan. 2006 – Dec. 2006).
48. Fadel, G., **Summers, J.**, Mocko, G., 2006, "Requirements Cascade Modeling", BMW Forschung und Technik GmbH, \$107,302 (40%), (Jan. 2006 – Dec. 2006).
49. **Summers, J.**, 2005-2007, "Lamelle Query System", Michelin Americas, \$67,296 (100%), Graduate Student: Srinivasan Anandan (MS Funded), (Aug. 2005 – Aug 2007).
50. **Summers, J.**, 2005-2006, "EAI 2005: Design Project: On-Truck Recycling System", Environmental America, Inc., \$8,000 (100%), Graduate Students: Eddie Smith (MS Funded), Tim Troy (MS), (Aug. 2005 – Aug. 2006).
51. **Summers, J.**, 2005-2006, "EAI 2005: Design Project: On-Truck Recycling System", Sustainable Universities Initiative – Alan Elzerman, \$8,000 (100%), Graduate Students: Eddie Smith (MS Funded), Tim Troy (MS), (Aug. 2005 – Aug. 2006).
52. **Summers, J.**, Blouin, V., Fadel, G., 2005, "Software for Automated Luggage Packing", General Motors, \$35,000 (25%), (Aug. 2005 – Dec. 2005).
53. **Summers, J.**, Grujicic, M., Thompson, L., 2005, "Lightweight Engineering: Headlight Optimization", BMW Forschung und Technik GmbH, \$55,622 (60%), Graduate Students: Mark Snider (MS Funded), Sudhakar Teegavarapu (MS Funded); Undergraduate Students: Shawn Pauley, Matthew Austin, Casey Manning, (Jan. 2005 – Dec. 2005).
54. Fadel, G., Blouin, V., Wiecek, M., **Summers, J.**, 2005, "Packaging Optimization with Evolving Shapes", US Army Tank-Automotive and Armaments Command, \$275,000 (5%), Graduate Students: Ming Wang (Ph.D. Funded), (May 2005 – Dec. 2005).
55. Thompson, L., Grujicic, M., **Summers, J.**, 2005-2006, "Lightweight Engineering: Seat Concept Optimization", BMW Forschung und Technik GmbH, \$85,790 (20%), (Jan. 2005 – July 2006).
56. **Summers, J.**, 2003, "Modeling Resistance to Data Flow in Collaborative Design: Industrial Case Study Exploration", University Research Grant, \$5,000 (100%), Graduate Students: Henry Vitali (MS Funded), (Jan. 2003 – Dec. 2003).

### **Proposals in Review**

**Summers, J.**, Shuffler, M., (2018), "Topic 4 Learning Theory: Mapping Teamwork Skills Acquisition and Transfer through Collective Learning Experiences", submitted to *US Army Research Institute*, \$800,000. (50%), Submitted June 2018.

**Summers, J.**, Wagner, J., (2018), "Electrolux 2018: Assembly Line Analysis for Level of Automation", submitted to *Electrolux*, \$30,000. (50%), Submitted May 2018.

Mocko, G., **Summers, J.**, (2018), "Innovation in Refrigerator French Door Sealing Design", submitted to *Samsung*, \$20,000 (50%), Submitted May 2018.

### **Other Sponsored Activity**

*CEDAR or AID Lab Design Project:*

Total Funding: \$95,300 (Summers' portion \$75,300)

Boeing; Project: design of wire harness inspection system. (Aug. 2018-May 2019). \$20,000. (50% with Mocko as co-instructor).

TTi (One World Technology): Concept Feasibility Lab. (Jan. 2015-present). \$30,000 donation to support Creative Inquiry team and lab. (100%). (Agreement signed Feb. 2015)

Hoowaki Shape Optimization. (Dec. 2013-Feb. 2014). \$4,000 (100%). 1 student worked on project.

Rotary; Project: Test Equipment Design for Lawnmower Blade Testing. (Aug. 2010-Dec. 2010). \$7,500 (50%). Two students worked on project.

TopTennis; Project: Redesign of Tennis Ball Throwing System. (Aug. 2010-Dec. 2010). \$12,500 (50%). Two students worked on project.

EAI; Project: redesign a combined trash/recycling truck for production. (Aug. 2006 – Aug. 2007). ~\$42,000 (partially billed – direct pay to students). Three students working on project.

JSV; Project: design an adjusting height swim platform for boat docks. (Feb. – May 2006). \$3,300 (100%). One student worked on project.

#### *Course Design Projects:*

Total Funding: \$327,500

Senior Design Capstone Course (ME 402).

- A total of 25 funded industry sponsored projects.
- Total funding for this course is \$300,000 from Fall 2004 to Spring 2010.
- Sponsoring companies include: Michelin, BMW, Clemson Environmental Technical Labs, Corning Cable Systems, Wright Metal Products, NASA Jet Propulsion Laboratory, TTI, Eaton, Rockwell Automation, Raytheon.
- NOTE: additional projects (Jacob's Chuck, NASA, Clemson Horticulture Department, Alexander Head Rest) were done pro-bono and one project was done where the funding was never collected: FujiFilm.

Product Innovation Maymester Course (ME 493/693/893; CES 490).

- A total of 3 funded industry sponsored projects.
- Total funding for this course is \$17,500 since May of 2006.
- Sponsoring companies include: Michelin, SkyBed

Advanced Design Methods Course (ME 870)

- A total of 2 funded industry sponsored projects.
- Total funding for this course is \$10,000 since Spring of 2005.
- Sponsoring companies include: BMW.

#### *Miscellaneous:*

Total: ~\$90,500

Visiting Professorship, Laboratoire G-SCOP and INP-Grenoble, \$11,500 (January-April 2013)

Visiting Professorship, Centre National de la Recherche Scientifique, \$15,000 (September-December, 2012).

Summer Faculty Fellowship, Office of Naval Research and American Society of Engineering Educators, (Intelligent Decision Aids Group), \$14,000 (June-August 2003).

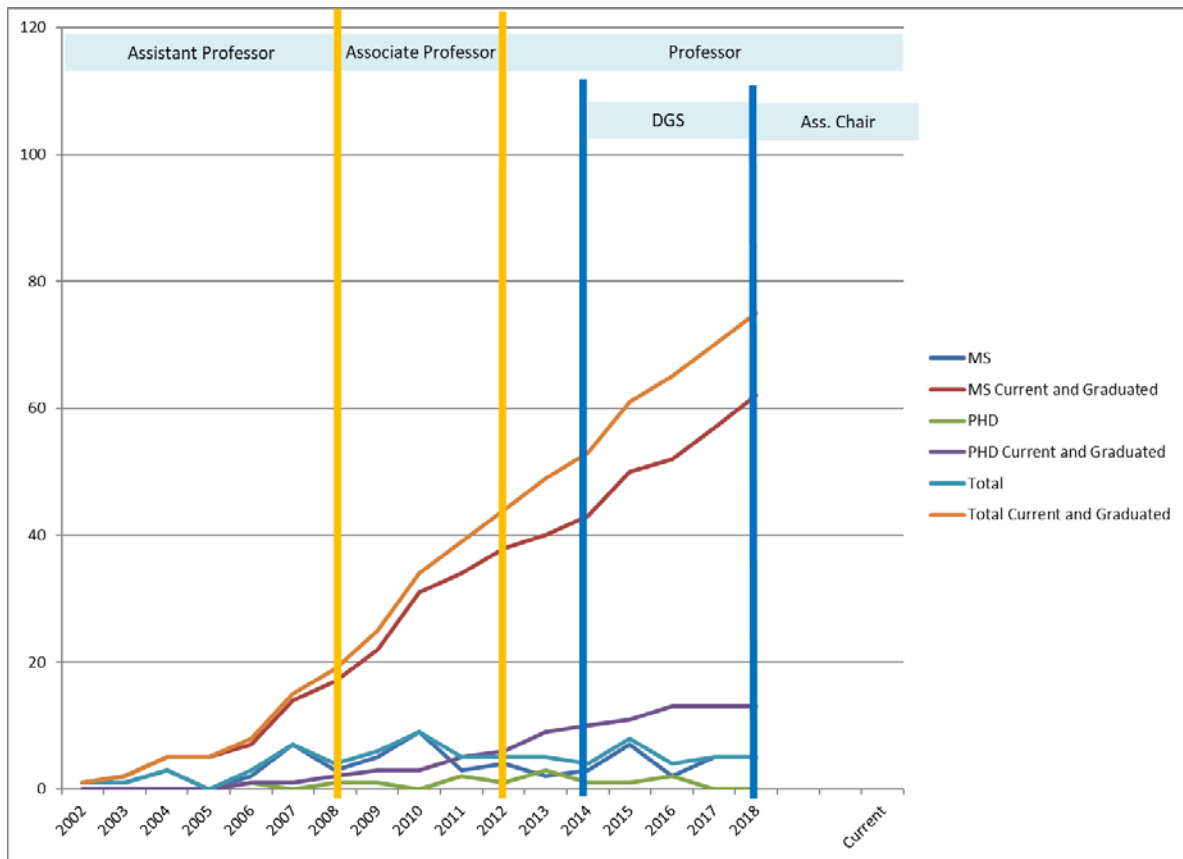
Negotiated three graduate internships with local companies (Reliable Sprinklers; BMW) for a total of 17 man-months (~\$50,000) (January 2006-May 2006; July 2006 – August 2006; January 2007 – October 2007)

### **GRADUATE STUDENT ADVISING**

This figure illustrates the advising trends for graduate students (generated May 2018). The vertical lines indicate major milestones in my professional career.

As an Associate Professor, from 2008-2012, I advised and graduated 12% of all ME Graduate Students.





### Graduated Students

Total Graduate Students supervised: 74 (13 PHD, 50 MS Thesis, 11 MS non-Thesis)

NOTE: the ME department graduated 72 PHDs (2006-2013). Summers accounts for 11% (8/72) of all departmental PHD degree's granted (2006-2013).

NOTE: the ME department has graduated 343 MS students (2006-2013). Summers accounts for 10% (35/343) of all departmental MS degree's granted (2006-2013)

NOTE: Summers has graduated 1 PHD and 1 MS student in Industrial Engineering as the sole research advisor and was a co-advisor for an Educational Leadership Doctorate.

NOTE: 36% of Summers graduated advisees have been recruited from the ME Capstone/Creative Inquiry programs

### *PhD Graduates*

13. Salmi, A., 2013-2016, Ph.D., "Aide à la Décision pour l'Optimisation du Niveau d'Automatisation durant la Conception des Systèmes d'Assemblage Industriels", **Graduated.** (co-advisor w/E. Blanco and P. David at INP-Grenoble).

- **NOTE:**
- **Publications:** J66, J75, C168, C173, C174
- **CURRENTLY WITH:**

12. Fazelpour, M., 2012-2016, Ph.D., "Developing Design guidelines for meso-scale periodic cellular materials", **Graduated.** (sole advisor). Supported by CU/Hoowaki.

- **Cooper Library:**
- **NOTE:**
- **Publications:** C143, C144, C159, C170, C176, C184, C185, J71, J74
- **CURRENTLY WITH:** University of Maryland (Assistant Teaching Faculty)

11. Phelan, K., 2012-2015, Ph.D., "Configuration Management in Manufacturing and Assembly: Case Study and Enabler Development", **Graduated.** (sole advisor). Supported by Automotive Research Center/BMW.

- **Cooper Library:** [http://tigerprints.clemson.edu/all\\_dissertations/1591/](http://tigerprints.clemson.edu/all_dissertations/1591/)

- **NOTE:** student received 2014 ASME DFMLC Fellow Award to attend IDETC and CIE Conference
  - **Publications:** C147, C156, C157, C160, C166, C169, C171, C175, C180, J73
  - **CURRENTLY WITH:** Electrolux (Senior Research Engineer)
10. Welsh, N., 2012-2014, E.D., "A Computational Model of Memetic Evolution: Optimizing Collective Intelligence", **Graduated.** (co-advisor w/ R. Marion).
    - **Cooper Library:** [http://tigerprints.clemson.edu/all\\_dissertations/1383/](http://tigerprints.clemson.edu/all_dissertations/1383/)
    - **INITIALLY WITH:** UNCC as Post-Doctoral Researcher with John Gero
  9. Joshi, S., 2011-2013, Ph.D., "Understanding the Role of Requirements in Design by Novice Engineers", **Graduated,** (sole advisor). Supported by CU/NIST.
    - 1/8: Eight ME PHD's awarded in 2013
    - **Cooper Library:** [http://tigerprints.clemson.edu/all\\_dissertations/1254/](http://tigerprints.clemson.edu/all_dissertations/1254/)
    - **NOTE:** student received 2010 Travel Grant to attend Capstone Design Conference
    - **NOTE:** student received 2011 Travel Grant to attend Mudd Design Conference
    - **Publications:** J47, J37, C137, C130, C126, C121, C120, C89, C83, A15, A11
    - **CURRENTLY WITH:** Carnegie Mellon University (Teaching Assistant Professor)
  8. Mehta, P., 2010-2013, Ph.D., "Automated Control of Manufacturing Systems", **Graduated.** (co-advisor w/ Dr. Mears). Supported by NSF/CU.
    - 1/8: Eight ME PHD's awarded in 2013
    - **Cooper Library:** [http://tigerprints.clemson.edu/all\\_dissertations/1181/](http://tigerprints.clemson.edu/all_dissertations/1181/)
    - **CURRENTLY WITH:** Alcoa (Special Projects Engineer)
  7. Namouz, E., 2011-2013, Ph.D., "Design for Assembly: Automation of Time Estimation", **Graduated.** (sole research advisor). Supported by Johnson Controls/CU.
    - 1/8: Eight ME PHD's awarded in 2013
    - **Cooper Library:** [http://tigerprints.clemson.edu/all\\_dissertations/1165/](http://tigerprints.clemson.edu/all_dissertations/1165/)
    - **CURRENTLY WITH:** TTI (Special Projects Engineer)
    - **Publications:** Ja4, J47, C135, C132, C119, C113, C105, C102
  6. Morkos, B., 2007-2012, Ph.D., "Computational Representation and Reasoning Support for Requirements Change Management in Complex Systems Design", **Graduated.** May 2012. (sole advisor). Supported by BMW/NASA/ASME Teaching Fellow.
    - 1/8: Eight Departmental PHD's awarded in 2012
    - **Cooper Library:** <http://etd.lib.clemson.edu/documents/1340720583/>
    - **NOTE:** student received 2007 ASME-NSF Design Essay Award (one of eight).
    - **NOTE:** student interned at BMW ITRC Summer 2008.
    - **NOTE:** student received 2009 ASME Teaching Fellowship (one of two)
    - **NOTE:** student received 2009 NIST CIE DETC Graduate Poster travel grant (one of three)
    - **NOTE:** student received 2010 Travel grant to attend Capstone Design Conference
    - **NOTE:** student received 2011 Travel Grant to attend Mudd Design Conference
    - **CURRENTLY WITH:** Florida Institute of Technology (Assistant Professor)
    - **Publications:** J48, J41, J40, J39, J22, C137, C126, C124, C120, C101, C100, C97, C96, C92, C88, C82, C80, C68, C62, C61, A15, A12
  5. Shankar, P., 2007-2011, Ph.D., "Development of a Design Method to Reduce Change Propagation Effects", **Graduated.** December 2011. (sole advisor). Supported by BMW/Michelin.
    - 1/20: Twenty Departmental PHD's awarded in 2011
    - **Cooper Library:** <http://etd.lib.clemson.edu/documents/1327691655/>
    - **CURRENTLY WITH:** Oshkosh Corporation (Senior Product Engineering Team Leader)
    - **NOTE:** student received 2008 ASME-NSF Design Essay Award (one of nine)
    - **NOTE:** student interned at International Truck Summer 2009
    - **CURRENTLY WITH:** Oshkosh Trucks (Project Leader)
    - **Publications:** J41, J39, J22, C127, C126, C117, C113, C96, C91, C61, P1
  4. Sen, Chiradeep., 2007-2011, Ph.D., "A Formal Representation of Mechanical Functions to Support Physics-Based Computational Reasoning in Early Mechanical Design", **Graduated.** August 2011. (sole advisor). Supported by Hartness/BMW/CU.

- 1/20: Twenty Departmental PHD's awarded in 2011
  - **Cooper Library:** <http://etd.lib.clemson.edu/documents/1327690764/>
  - **NOTE:** student received 2013 ASME CIE Division Best Dissertation Award (inaugural recipient)
  - **NOTE:** student received 2007 ASME-NSF Design Essay Award (one of eight).
  - **NOTE:** student received 2008 ASME-NSF Design Essay Award (one of nine)
  - **NOTE:** student received 2009 CAPPD DETC Graduate Poster travel grant (one of three)
  - **NOTE:** student received 2010 Department of Mechanical Engineering Teaching Fellowship
  - **CURRENTLY WITH:** Florida Institute of Technology (Assistant Professor)
  - **Publications:** J43, J36, J34, J30, J29, J26, J16, Ja11, Ja10, Ja6, Ja4, C129, C128, C115, C110, C95, C81, C71, C67, C66, C65, C52, C51
3. Teegavarapu, S., 2005-2009, Ph.D., "Foundations of Design Method Development", **Graduated.** May 2009. (sole advisory). Supported by BMW/CU/Michelin.
    - 1/6: Six Departmental PHD's awarded in 2009
    - **Cooper Library:** <http://etd.lib.clemson.edu/documents/1246559346/>
    - **NOTE:** student received 2005 ASME-NSF Design Essay Award (one of eight).
    - **NOTE:** student received 2006 ASME-NSF Design Essay Award (one of eight).
    - **CURRENTLY WITH:** Siemens (Senior Engineer)
    - **Publications:** J22, J18, J13, J9, B5, C62, C61, C59, C55, C54, C49, C48, C43, C35, C34
  2. Anandan, S., 2004-2008, Ph.D., "Similarity metrics applied to graph based design model authoring", **Graduated.** August 2008. (sole advisor). Supported by Michelin/NSF/JPL.
    - 1/7: Seven Departmental PHD's awarded in 2018
    - **Cooper Library:** <http://etd.lib.clemson.edu/documents/1219855195/>
    - **NOTE:** student interned at Reliable Sprinklers Spring and Summer 2007.
    - **CURRENTLY WITH:** SolidWorks (API Lead Engineer)
    - **Publications:** Ja7, J7, J6, B5, C57, C41, C40, C34, C33
  1. Pehlivan, S., 2002-2006, Ph.D., "Representation for Integration of Computer Aided Fixture Design Systems", **Graduated.** December 2006. (sole advisor). Supported by CU.
    - 1/7: Seven Departmental PHD's awarded in 2006
    - **Cooper Library:** TJ153 .P445 2006; <http://libcat.clemson.edu/record=b1913612~S15>
    - **CURRENTLY WITH:** Everest Production Corporation (Vice President)
    - **Publications:** J21, J11, C30, C26

#### *Masters Graduates (thesis)*

50. Chawla, A., 2017-2018, MS, "An Experimental Investigation of the Effect of Functional Ordering on Morphological Chart Exploration", **Graduated** May 2018. Supported by BMW/CU.
  - **Cooper Library:**
  - **CURRENTLY WITH:**
  - **Publications:**
49. Stidham, H., 2016-2018, MS, "A Study of Personality Perception Evolution in Mechanical Engineering Design Teams", **Graduated** May 2018. Supported by TTI/BMW/CU.
  - **Cooper Library:**
  - **CURRENTLY WITH:**
  - **Publications:**
48. Chickarello, D., 2016-2018, MS, "Establishing a Protocol to Observe Leadership Behaviors in Engineering Design Teams", **Graduated** May 2018. supported by FreightFarms/NASA/BMW.
  - **Cooper Library:**
  - **CURRENTLY WITH:**
  - **Publications:**
47. Patel, A., 2015-2018, MS, "An Investigation of Modeling Behaviors in Function Structure Modeling", **Graduated** May 2018. Supported by BMW/NSF.
  - **Cooper Library:**
  - **CURRENTLY WITH:**
  - **Publications:**

46. Delspina, B., 2015-2017, MS, "Requirement Culture at a Large Scale Medical Device Developer: A Case Study", **Graduated** May 2017. Supported by ProNova/NSF.
  - **Cooper Library:**
  - **CURRENTLY WITH:**
  - **Publications:**
45. Knackstedt, S., 2015-2017, MS, "A case study of part change management from a development and production perspective in a major automotive OEM", **Graduated** May 2017. Supported by BMW/NSF/CU.
  - **Cooper Library:**
  - **CURRENTLY WITH:** BMW North America
  - **Publications:** J72, C179, A20
44. O'Shields, S., 2014-2016, MS, "Design Collaboration in Industry: What, When, and Why?", **Graduated** Dec. 2016. Supported by CU.
  - **Cooper Library:**
  - **CURRENTLY WITH:** Clemson University (PHD)
  - **Publications:** C146, C158, C172, C178, C182, C183, A19, A20
43. Visotsky, D., 2015-2016, MS, "Using Design Requirements for Environmental Assessment of Products", **Graduated** Aug. 2016. Supported by CU, Argentine Fellowship.
  - **Cooper Library:**
  - **CURRENTLY WITH:**
  - **Publications:**
42. Moylan, J., 2014-2015, MS, "Sound Reduction of Air Compressors Using a Systematic Approach", **Graduated** Dec. 2015. Supported by TTi.
  - **Cooper Library:** [http://tigerprints.clemson.edu/all\\_theses/2244/](http://tigerprints.clemson.edu/all_theses/2244/) (embargoed for 2 years)
  - **CURRENTLY WITH:** TTi (Product Engineer)
  - **Publications:** C146, C158, C183, A19
41. Rawal, V., 2014-2015, MS, "A Retrospective Study of the Motivations and Perceptions of Industry Sponsors and Academia Regarding Mechanical Engineering Capstone Design Program", **Graduated** Dec. 2015. Supported by CU/BMW.
  - **CURRENTLY WITH:**
  - **Publications:** C178
40. Ravikumar, N., 2014-2015, MS, "Development and Validation of an Optically-Based Strain Measuring Orthopaedic Screw for Fracture Fixation Implants", **Graduated** August 2015. Supported by CU (BioEngineering). (co-advisor with J. DesJardins)
  - **Cooper Library:** [http://tigerprints.clemson.edu/all\\_theses/2206/](http://tigerprints.clemson.edu/all_theses/2206/)
  - **CURRENTLY WITH:** Clemson University (ME PhD Student)
  - **Publications:**
39. Dhulia, J., 2014-2015, MS, "A Systems Level Approach for Selection Between Manual and Automated Work Zones within Assembly Lines", **Graduated** August 2015. Supported by CU.
  - **CURRENTLY WITH:**
  - **Publications:** C173
38. Sridhar, S., 2014-2015, MS, "Sensitivity and Precision Analysis of the Graph Complexity Connectivity Method", **Graduated** August 2015. Supported by CU.
  - **Cooper Library:** [http://tigerprints.clemson.edu/all\\_theses/2209/](http://tigerprints.clemson.edu/all_theses/2209/)
  - **CURRENTLY WITH:**
  - **Publications:** J74, C176, A18
37. Thiagarajan, A., 2014-2015, MS, "Functional Thinking: A Protocol Study", **Graduated** August 2015. Supported by CU/BMW.
  - **Cooper Library:** [http://tigerprints.clemson.edu/all\\_theses/2195/](http://tigerprints.clemson.edu/all_theses/2195/)
  - **CURRENTLY WITH:**
  - **Publications:**

36. Vasala, S., 2013-2014, MS, "A Comparative Study: Structural Complexity Metrics Applied Against Function and Assembly Product Graphs to Predict Market Price and Assembly Time", **Graduated** May 2014. Supported by CU.
  - **Cooper Library:** [http://tigerprints.clemson.edu/all\\_theses/1843/](http://tigerprints.clemson.edu/all_theses/1843/)
  - **CURRENTLY WITH:** Schaffler
  - **Publications:**
35. Worinkeng, E., 2011-2013, MS, "Analyzing Requirement Type Influence on Generated Solutions", **Graduated** Dec. 2013. Supported by CU/BMW.
  - **Cooper Library:** [http://tigerprints.clemson.edu/all\\_theses/1815/](http://tigerprints.clemson.edu/all_theses/1815/)
  - **CURRENTLY WITH:** Boeing
  - **Publications:**
34. Thimmaiah, S., 2012-2013, MS, "An Experimental Study on the Influence that Failure Number, Specialization, and Domain have on Confidence in Predicting System Failures", **Graduated** May 2013. Supported by CU/IFAI.
  - **Cooper Library:** [http://tigerprints.clemson.edu/all\\_theses/1654/](http://tigerprints.clemson.edu/all_theses/1654/)
  - **CURRENTLY WITH:** MuSigma as Analyst
  - **Publications:**
33. Shanthakumar, A., 2010-2012, MS, "Development of Feature Recognition Algorithm for Automated Identification of Duplicate Geometries in CAD Models", **Graduated** Dec. 2012. Supported by NASA/Rotary/ARC/IFAI/CU.
  - **Cooper Library:** [http://tigerprints.clemson.edu/all\\_theses/1513/](http://tigerprints.clemson.edu/all_theses/1513/)
  - **CURRENTLY WITH:** Part Maker as Software Engineer
  - **Publications:** C132, C119, C115
32. Hess, T., 2011-2012, MS, "Investigation of Prototype Roles in Conceptual Design Using Case Study and Protocol Study Methods", **Graduated** Aug. 2012. Supported by CU/IFAI.
  - **Cooper Library:** <http://etd.lib.clemson.edu/documents/1349104126/>
  - **CURRENTLY WITH:** Polaris as Design Engineer
  - **Publications:** C124
31. Owensby, J., 2010-2012, MS, "Automated Assembly Time Prediction Tool Using Predefined Mates from CAD Assemblies", **Graduated** May 2012. Supported by CU.
  - **Cooper Library:** <http://etd.lib.clemson.edu/documents/1340723825/>
  - **CURRENTLY WITH:** AEC as Product Engineer
  - **Publications:** C132, C119
30. Griesse, D., 2010-2012, MS, "Finite Element Modeling and Design of Honeycomb Sandwich Panels for Acoustic Performance", **Graduated** May 2012. Supported by NASA/Rotary/BMW.
  - **Cooper Library:** <http://etd.lib.clemson.edu/documents/1340720928/>
  - **CURRENTLY WITH:** Michelin as Tire Designer
  - **Publications:** Ja5, C133, C117, C113
29. Rayate, V., 2010-2012, MS, "A Tool for Selection of Design for Manufacturing and Assembly Rules During Product Design Stage While Considering End-of-Life Conditions", **Graduated** May 2012. Supported by CU/NASA/IFAI.
  - **Cooper Library:** <http://etd.lib.clemson.edu/documents/1340720678/>
  - **CURRENTLY WITH:** KSPG
  - **Publications:** C134, C119
28. Miller, M., 2010-2011, MS, "Product and Process Based Assembly Time Estimation in Engineering Design" **Graduated** Dec 2011. (sole advisor). Supported by CU/BMW.
  - **Cooper Library:** <http://etd.lib.clemson.edu/documents/1327697963/>
  - **CURRENTLY WITH:** KTM Consulting
  - **Publications:** C136, C133, C111
27. Schultz, J., 2009-2011, MS, "Modeling and Finite Element Analysis Methods for the Dynamic Crushing of Honeycomb Cellular Meso-Structures", **Graduated** May 2011. (co-advisor with L. Thompson). Supported by Michelin/NASA.
  - **Cooper Library:** <http://etd.lib.clemson.edu/documents/1306872973/>

- **CURRENTLY WITH:** ForceProtection
  - **Publications:** Ja5, C117, C95
26. Mathieson, J., 2009-2011, MS, "Connective Complexity Methods for Analysis and Prediction in Engineering Design", **Graduated** May 2011. (sole advisor). Supported by NASA/BMW/SC Space Grant.
- **Cooper Library:** <http://etd.lib.clemson.edu/documents/1306872320/>
  - **CURRENTLY WITH:** Clemson University, ME Department (PHD student)
  - **Publications:** Ja9, J45, C136, C127, C115, C114, C111, C103, C95, C94, C85, C80, C65, A10
25. Berglind, L., 2009-2010, MS, "Design Tool Development for Cellular Structure Synthesis to Achieve Desired Properties", **Graduated** December 2010. (sole advisor). Supported by Michelin/Johnson Controls.
- **Cooper Library:** <http://etd.lib.clemson.edu/documents/1306858953/>
  - **CURRENTLY WITH:** University of North Carolina – Charlotte, ME Department (PHD student)
  - **Publications:** J46, J28, C99, C89, C77, A13, P2
24. Richardson, J., 2009-2010, MS, "Incorporating Function Structures into Morphological Charts: A User Study", **Graduated** December 2010. (co-advisor with G. Mocko). Supported by BMW.
- **Cooper Library:** <http://etd.lib.clemson.edu/documents/1306858485/>
  - **CURRENTLY WITH:** EZ Go
  - **Publications:** Ja4, J42, C107
23. Namouz, E., 2009-2010, MS, "Mass and Assembly Time Reduction for Future Generation Automotive Vehicles Based on Existing Vehicle Model", **Graduated** December 2010. (co-advisor with G. Mocko). Supported by BMW/Johnson Controls.
- **Cooper Library:** <http://etd.lib.clemson.edu/documents/1306858732/>
  - **CURRENTLY WITH:** Clemson University ME Department (PHD Student)
  - **Publications:** Ja4, J47, C135, C132, C119, C113, C105, C102
22. Joshi, S., 2008-2010, MS, "Mapping Problem and Requirements to Solution: Document Analysis of Senior Design Projects", **Graduated** December 2010. (sole advisor). Supported by CU/Michelin/NASA.
- **Cooper Library:** <http://etd.lib.clemson.edu/documents/1306858033/>
  - **CURRENTLY WITH:** Clemson University ME Department (PHD Student)
  - **Publications:** J47, J37, C137, C130, C126, C121, C120, C89, C83, A15, A11
21. Kolla, A., 2008-2010, MS, "Design Method Development for the Design of Traction Systems", **Graduated** December 2010, (sole advisor). Supported by CU/ARC/Michelin/NASA.
- **Cooper Library:** <http://etd.lib.clemson.edu/documents/1285788510/>
  - **CURRENTLY WITH:** Superior Engineering
  - **Publications:** C87, C75, C64, P4
20. Palmer, G., 2008-2010, MS "The Characterization of Leadership within Undergraduate Engineering Design Teams through Case Study Analysis", **Graduated** August 2010, (sole advisor). Supported by NASA/BMW/CU.
- **Cooper Library:** <http://etd.lib.clemson.edu/documents/1285786662/>
  - **CURRENTLY WITH:** Clemson University IE Department (PHD student)
  - **Publications:** C108, C88, C82
19. Smith, E., 2005-2010, MS, "Re-Engineering a Trash/Recycling Collection Vehicle", **Graduated** May 2010, (sole advisor). Supported by EAI/CU/Fluor Daniel.
- **Cooper Library:** <http://etd.lib.clemson.edu/documents/1285614445/>
  - **CURRENTLY WITH:** Fluor Daniel
  - **Publications:** C45
18. Hannah, R., 2007-2009, MS, "User Study of Information Extracted from Engineering Representations", **Graduated** Aug. 2009, (sole advisor). Supported by CU.
- **Cooper Library:** <http://etd.lib.clemson.edu/documents/1256570790/>
  - **CURRENTLY WITH:** Boeing
  - **Publications:** J37, C83, C56



17. Osborn, J., 2005-2009, MS, "Survey of Concurrent Engineering Environments and the Application of Best Practices towards the Development of Multiple Industry, Multiple Domain Environment", **Graduated** Aug. 2009. (sole advisor). Supported by SCRA.
  - **Cooper Library:** <http://etd.lib.clemson.edu/documents/1252424858/>
  - **CURRENTLY WITH:** SCRA
  - **Publications:** C109, C36
16. Sen, C., 2007-2009, MS, "A Study in the Information Content, Consistency, and Expressive Power of Function Structures in Mechanical Design", **Graduated** May 2009. (co-advisor with Mocko). Supported by Hartness/BMW/CU.
  - **Cooper Library:** <http://etd.lib.clemson.edu/documents/1249065928/>
  - **CURRENTLY WITH:** Oregon State University (Post-Doc)
  - **Publications:** J33, J29, J28, J25, J16, Ja15, Ja6, C115, C110, C95, C81, C71, C67, C66, C65, C52, C51
15. Stowe, D., 2007-2009, MS, "Investigating the Role of Prototyping in Mechanical Design Using Case Study Validation", **Graduated** May 2009. (sole advisor). Supported by NASA/SC Space Grant.
  - **Cooper Library:** <http://etd.lib.clemson.edu/documents/1246558333/>
  - **NOTE:** student received 2007 SC Space Grant Fellowship
  - **CURRENTLY WITH:** Corvid Technologies
  - **Publications:** C104, C58
14. Michaelraj, A., 2007-2009, MS, "Taxonomy of Physical Prototypes: Structure and Validation", **Graduated** May 2009. (sole advisor). Supported by Michelin/CU.
  - **Cooper Library:** <http://etd.lib.clemson.edu/documents/1246565761/>
  - **CURRENTLY WITH:** Trane
  - **Publications:** J22, C62, C61, C56, P1
13. Miller, W., 2006-2008, MS, "Three Design Tool Focused Case Studies of Mechanical Engineering Design Projects", **Graduated** Aug. 2008. (sole advisor) Supported by EAI/Michelin.
  - **Cooper Library:** <http://etd.lib.clemson.edu/documents/1220473549/>
  - **NOTE:** student interned at Ryobi Summer 2008.
  - **CURRENTLY WITH:** TTI
  - **Publications:** Ja8, B7, C59, C55
12. Kanda, A., 2006-2008, MS, "An Investigative Study of Patent Information and Representation from a Mechanical Engineering Design Perspective", **Graduated** Aug. 2008. (sole advisor) Supported by BMW.
  - **Cooper Library:** <http://etd.lib.clemson.edu/documents/1219953747/>
  - **CURRENTLY WITH:**
  - **Publications:** C62, C61, C49
11. Johnston, P., 2006-2007, MS, "The Role of Computer Aided Engineering in Developing a Combined Trash and Recycling Truck: A Case Study", **Graduated** Dec. 2007. (sole advisor) Supported by EAI.
  - **Cooper Library:** <http://etd.lib.clemson.edu/documents/1202500607/>
  - **CURRENTLY WITH:** Corning Cable Systems
  - **Publications:** J31, C45, A6
10. Smith, G., 2003-2007, MS, "Morphological Charts: A Systematic Exploration of Qualitative Design Space", **Graduated** Dec. 2007. (sole advisor). Supported by Michelin.
  - **Cooper Library:** <http://etd.lib.clemson.edu/documents/1202500458/>
  - **CURRENTLY WITH:** Michelin
  - **Publications:** J42, C37, C36
9. Kayyar, M., 2006-2007, MS, "Development of a Design Enabler Tool for Frame Analysis for a Small Enterprise: A Case Study", **Graduated** Dec. 2007. (co-advisor with S. Biggers). Supported by WMP.
  - **Cooper Library:** <http://etd.lib.clemson.edu/documents/1202499546/>
  - **CURRENTLY WITH:** Gulfstream
  - **Publications:** J44, C46
8. Srirangam, N., 2006-2007, MS, "A Case Study on Design Exemplar as a Search and Retrieval Tool", **Graduated** Dec. 2007. (sole advisor). Supported by CU/Michelin.

- **Cooper Library:** <http://etd.lib.clemson.edu/documents/1202418227/>
  - **CURRENTLY WITH:**
  - **Publications:** Ja7, C57
7. Chavali, S., 2005-2007, MS, "Case Study Investigating Rule Based Design in an Industrial Setting", **Graduated** Dec. 2007. (co-advisor with G. Mocko). Supported by Hartness International.
    - **Cooper Library:** <http://etd.lib.clemson.edu/documents/1202418163/>
    - **NOTE:** student interned at Reliable Sprinklers Fall 2006.
    - **CURRENTLY WITH:** Schneider Electric
    - **Publications:** J16, C52
  6. Putti, S., 2004-2007, MS, "Design Exemplar: Dynamic Networks", **Graduated** May 2007. (sole advisor). Supported by CU.
    - **Cooper Library:** <http://etd.lib.clemson.edu/documents/1181250672/>
    - **NOTE:** student received 2005 ASME-NSF Design Essay Award (one of eight).
    - **CURRENTLY WITH:**
    - **Publications:** C38
  5. Snider, M., 2004-2006, MS, "Extended Toolset for Reverse Engineering to Support Lightweight Engineering", **Graduated** August 2006. (sole advisor). Supported by BMW.
    - **Cooper Library:** TJ153 .S64 2006; <http://libcat.clemson.edu/record=b1913623~S1>
    - **NOTE:** student interned at BMW Spartanburg Spring 2006.
    - **CURRENTLY WITH:** Force Protection
    - **Publications:** J13, J9, C35, C32
  4. Wetmore, W., 2004, MS, "PRSM: Proper Review Selection Matrix", **Graduated**, December 2004. (sole advisor). Supported by Bosch.
    - **Cooper Library:** TJ153 .W48 2004; <http://libcat.clemson.edu/record=b1828560~S1>
    - **CURRENTLY WITH:** SCANA
    - **Publications:** J23, J4, C23, C19, C18
  3. Bayanker, S., 2004, MS, "A Comparative Study of CAD Input Devices", **Graduated**, December 2004, (research advisor; co-advisor with Anand Gramopadhye). Supported by CU-Industrial Engineering.
    - **Cooper Library:** T56.24 .B439 2004; <http://libcat.clemson.edu/record=b1828852~S1>
    - **CURRENTLY WITH:**
    - **Publications:** J20, C39
  2. Divekar, A., 2004, MS, "The Design Exemplar: Foundation for a CAD Query Language", **Graduated**, August 2004. (sole advisor). Supported by CU.
    - **Cooper Library:** TJ153 .D59 2004; <http://libcat.clemson.edu/record=b1883838~S1>
    - **CURRENTLY WITH:** 3D PLM Software
    - **Publications:** J6, J4, C25, C16, C14
  1. Ostergaard, K., 2002, MS, "Investigation of Resistance to Information Flow in the Collaborative Design Process", **Graduated**, December 2002. (sole advisor). Supported by Michelin.
    - **Cooper Library:** TJ153 .O835 2002; <http://libcat.clemson.edu/record=b1771133~S1>
    - **CURRENTLY WITH:** Urban Home Revival (President)
    - **Publications:** J17, J8, J4, C22, C18, C17, C13

#### *Masters Graduates (non-thesis)*

11. Gill, A., 2014-2017, MS, "Graph Complexity to Predict Design Information", **Graduated** Dec 2017. (sole advisor). Supported by CU/BMW/NSF (switched to AuE Fall 2016 after failing PhD qualifiers).
10. Andrews, P., 2015-2017, MS, "ANN Architecture Performance", **Graduated** May 2017. (sole advisor). Supported by BMW/NSF/CU. (switched to non-thesis Summer 2016 to focus on 6<sup>th</sup> year of eligibility for Clemson baseball team)
9. Addis, R., 2016-2017, MS, "Meso-Structure Design Guidelines", **Graduated** May 2017. (sole advisor). Supported by CU. (switched to non-thesis Fall 2016 upon relocating out of state with partner)
8. Jaradat, M., 2013-2015, MS (en route), "Model Construction for Spinal Cord Damage Analysis", **Graduated** (MS en route) December 2015. (ME advisor). Supported by CU.



7. Phelan, K., 2012-2014, MS (en route), "Software Support for Verification, Validation, and Testing Planning", **Graduated** (MS en route) May 2014. (sole advisor). Supported by US Army/BMW.
6. Thoe, S., 2011-2014, MS (non-thesis), "Complexity Metric Prediction of Problem Effort", **Graduated** May 2014. (sole advisor). Supported by CU
  - **CURRENTLY WITH:** ZF
  - **Publications:** C104, C63, A16,
5. Veisz, D., 2009-2010, MS (non-thesis), "Comparison of Academic and Industry Perceptions of Role of CAD in Engineering Design", **Graduated** May 2010. (sole advisor). Supported by Reliable Sprinklers.
  - **CURRENTLY WITH:** Reliable Sprinklers
  - **Publications:** J47
4. Morkos, B., 2007-2008, MS (en route), "Thermal Management Design for LED Headlights", **Graduated** (MS en route) May 2008. (sole advisor) Supported by BMW.
  - **Publications:** J22, Ja11, Ja8, Ja7, C124, C120, C101, C100, C97, C96, C92, C88, C82, C80, C68, C62, C61, A15, A12
3. Nowlay, A., 2006-2007, MS (non-thesis), "Design of Tail Light Assembly Fixture for X5", **Graduated** Aug. 2007. (sole advisor). Supported by CU.
  - **CURRENTLY WITH:** Siemens
2. Troy, T., 2005-2006, MS (non-thesis), "Technology Innovation vs. Incentives for Influencing Public Policy", **Graduated**, May 2006. (sole advisor). Supported by CU.
  - **CURRENTLY WITH:** Chicago Bridge and Iron
  - **Publications:** J31, C37, C36, A6
1. Gunturi, S., 2002-2003, MS (non-thesis), "Development of a Collaborative CAD System to Support Distributed Querying Using PDA Hardware", **Graduated**, December 2003. (co-advisor with Georges Fadel). Supported by CU.
  - **CURRENTLY WITH:**

### Current Graduate Advising

#### *MS Students*

6. Ahirrao, Sanghamitra Ahirrao, 2018-present, MS, *Morphological Charts*. Supported by CU.
5. Spivey, N., 2018-present, MS, *Level of Automation*. Supported by CU/BMW.
4. Wentzky, E., 2018-present, MS, *Level of Automation*. Supported by BMW.
3. Elena, M., 2018-present, MS, *Team Dynamics*. Supported by BMW/CU.
2. Lambert, E., 2017-present, MS, *Product Evolution*. Supported by ABB/Baldor.
1. Gendreau, E., 2016-present, MS, *TBD*, supported by CU/NSF.

#### *Ph.D. Students*

3. Patel, A., 2018-present, PhD., *Function Representation*, current. (sole advisor). Supported by NSF/BMW.
2. Righter, J., 2015-present, PhD., *Teamwork in Design*, current. (sole advisor). Supported by CU.
1. Yoder, M., 2014-present, Ph.D., *Meso-Structures*, current. (co-advisor w/ L. Thompson). Supported by SC Space Grant/CU.

### Undergraduate (Completed)

37. Curran, T., 2013-2014, Undergraduate Research, "Wireless Heated Mug", **completed**, May 2014.
36. Noranzyk, A., 2011-2012, Undergraduate Research, "Honeycomb Acoustic Testing", **completed**, May 2012
35. Fenton, T., 2012, Undergraduate Research, "Manufacturing Analysis", **completed**, May 2012.
34. Thoe, S., 2007-2011, Undergraduate Research, "Lunar Tweel Design", **completed**, May 2011.
33. Hancock, T., 2009, Summer Intern, "Traction Concept Design/Testing", **completed**, Aug. 2009.
32. Julian, M., 2009, ME Research, "Traction Concept Design/Testing", **completed**, Aug. 2009.
31. Edge, M., 2009, Summer Intern, "Traction Concept Design/Testing", **completed**, Aug. 2009.
30. Edge, K., 2009, Summer Intern, "Traction Concept Design/Testing", **completed**, Aug. 2009.
29. Satterfield, H., 2009, ME Research, "Sand Modeling and Testing", **completed**, Aug. 2009.
28. Elmore, B., 2009, EUREKA, "Sand Modeling and Testing", **completed**, Aug. 2009.
27. Tanner, J., 2009, EUREKA, "Sand Modeling and Testing", **completed**, Aug. 2009.

26. Wallace, C., 2009, EUREKA, "Traction Testing for Lunar Wheel", **completed**, Aug. 2009.
25. Mendes, M., 2009, EUREKA, "Traction Testing for Lunar Wheel", **completed**, Aug. 2009.
24. Torok, M., 2009, Undergraduate SC Space Grant Research, "Balloon Tests", **completed**, May 2009.
23. Mathieson, J., 2008-2009, Undergraduate Honors Research, "Information Generation", **completed**, May 2009.
22. Namouz, E., 2008, Undergraduate Research, "Lazy Part Redesign", **completed**, Dec. 2009.
21. Torok, M., 2008, Summer Research, "Design of Lunar Testing", **completed**, Aug. 2008.
20. O'Dell, A., 2008, Summer Research, "Design of Lunar Testing", **completed**, Aug. 2008.
19. Switzer, S., 2008, EUREKA, "Traction Testing for Lunar Wheel", **completed**, Aug. 2008.
18. King, K., 2008, EUREKA, "Adhesion Testing for Lunar Tread", **completed**, Aug. 2008.
17. Roc, G., 2008, EUREKA, "Wear Testing for Lunar Tread", **completed**, Aug. 2008.
16. Thoe, S., 2008, "Creative Inquiry, "Mini-Go-Round Design", **completed**, May 2008.
15. Merrino, J., 2008, "Creative Inquiry, "Mini-Go-Round Design", **completed**, May 2008.
14. Northup, K., 2008, "Creative Inquiry, "Mini-Go-Round Design", **completed**, May 2008.
13. Wallis, K., 2008, Creative Inquiry, "Mini-Go-Round Design", **completed**, May 2008.
12. Conger, K., 2007, Undergraduate Honors, "Lunar Tweel Design", **completed**, Dec. 2007.
11. Terry, C., 2007, Undergraduate Research, "Lunar Tweel Design", **completed**, Dec. 2007.
10. Thoe, S., 2007, EUREKA, "Pressure Measurement for Testing Tweels™", **completed**, Aug. 2007.
9. Miller, W., 2006, Undergraduate Research, "Facility Design for Off-load Site of Combined Recycling and Trash Truck", **completed**, May 2006
8. Werner, H., 2006, Undergraduate Research, "Trash Compactor Design for Combined Recycling and Trash Truck", **completed**, May 2006.
7. Austin, M., 2005, Undergraduate Research, "Lightweight Engineering: BMW 6 Series", **completed**, December 2005.
6. Manning, C., 2005, Undergraduate Research, "Lightweight Engineering: BMW 3 Series", **completed**, December 2005.
5. Pauley, S., 2005, Undergraduate Research, "Lightweight Engineering: Opel Astra", **completed**, December 2005.
4. Parker, R., 2005, Undergraduate Research, "Adapted Foot Steering", **completed**, May 2005.
  - NOTE: resulted in a 5<sup>th</sup> place finish at the Regional ASME Old Guard Competition.
3. Dempsey, C., 2004, Undergraduate Research, "Case Studies in Fixture Design with a New Representation", **completed**, May 2005.
  - NOTE: resulted in 2005 ASME Conference Publication.
2. Nichols, H., 2004, Undergraduate Research, "University and Industry Collaboration", **completed**, May 2004.
1. Danker, J., 2002, REU Student, "Design Exemplars and Gear Design", **completed**, August 2002.

#### **Diplome & International (Completed)**

5. Walchli, N., 2004, Diplome, "Impact of Innovation to Sustainable Business Success", **Graduated**, (co-advisor with Markus Meier and Georges Fadel)
4. Gunzenhauser, M., 2004, Diplome, "Collaboration between University and Industry in the Field of Product Innovation", **Graduated**, (co-advisor with Markus Meier and Georges Fadel)
3. Wommer, J., 2004, German Foreign Exchange, "Integration of CNC to an Undergraduate Lab Sequence", **completed**.
2. Berthod, Benoit, 2003, French Foreign Exchange, "Development of a Design Exemplar Production System for Gear Design", **completed**, July 2003.
1. Galea, F., 2002, French Foreign Exchange, "Implementation of the CADShell on the PocketPC", **completed**, August 2002.

#### **Visiting Graduate Students (Completed)**

3. Karimian, P., (PHD) 2009, summer study (NASA), home institution: University of Maryland. **completed**. home advisor: J. Hermann.
2. Kale, V., 2006, (MS) semester study (NSF), home institution: Michigan Tech. **completed**. home advisor: B. Bettig.

1. Bapat, V., (PHD) 2006, semester study (NSF), home institution: Michigan Tech. **completed**. home advisor: B. Bettig

### **Post-Doctoral (Completed)**

5. Ju, J., 2008-2011, Ph.D. from Texas A&M University (2006), **completed**. Supported by Michelin/NASA.
  - **CURRENTLY WITH:** North Texas University Mechanical Engineering Department (Assistant Professor)
  - **Publications:** J32, J31, J27, J26, Ja13, Ja12, Ja2, Ja1, C117, C116, C112, C98, C91, C89, C87, C79, C77, C76, C73, C72, C70, A14, A13, P4, P3, P2, P1
4. Karimian, P., 2010, Ph.D. from University of Maryland (2010), **completed**. Supported by BMW/NASA.
  - **NOTE:** left the position early for personal health reasons.
3. Ma, J., 2008-2010, Ph.D. from Kansas State University (2007), **completed**. Supported by NASA.
  - **CURRENTLY WITH:** St. Louis University Mechanical and Aerospace Engineering Department (Assistant Professor)
  - **Publications:** C123, C122, C119, C106, C93, C90, C84, C79, C78, C75, C74, C69, C64
2. Ameri, F., 2007-2008, Ph.D. from University of Michigan (2006), **completed**. Supported by BMW/Michelin.
  - **CURRENTLY WITH:** Texas State University Industrial and Manufacturing Engineering Department (Assistant Professor)
  - **Publications:** J29, J21, J15, J14, Ja4, B6, C67, C53, C50, C46
1. Maier, J., 2006-2008, Ph.D. from Clemson University (2005), **completed**. Supported by BMW/NSF/Michelin.
  - **CURRENTLY WITH:** Clemson University General Engineering Department (Lecturer)
  - **Publications:** J30, C43, C42, C41, C40, A7, A6

### **Hosted Visitors**

1. Zanker, W., 2016 (UMAS), Germany.
2. Mochida, S., 2015-2016 (University of Marketing and Distribution Science), Japan.
3. Boujut, F., 2015 (Grenoble Tech), France.
4. Khaustov, S., 2012 (Fulbright), Ukraine.

### **TEACHING**

Total courses taught: 20. Total assignments taught: 161. This is an average of ~10 assignments per year (Fall/Spring/Summer).

Excluding Creative Inquiry, Senior Design Advisory assignments, and graduate version of undergraduate courses, the total is greater than 80 assignments with an average of >5 courses per year.

### **Courses Taught (undergraduate: 13 courses; 122 assignments)**

AMFG 3800 (S17)

- NOTE: developed this course as a hands-on discovery of manufacturing systems, issues, and processes to serve as a general gateway for the Advanced Manufacturing Certificate

ME 2900, 3900, 4900 (formerly ME 290, 390, 490), *Creative Inquiry*, (S08, F08, S09, F09x2, S10x2, F10x2, S11x2, F11, S12, F12, S13, F13, S14x2, Su14, F14x2, S15x2, F15x2, S16x2, F16, S17, F17x2, S18x2)

- NOTE: four conference papers have directly resulted from this work
- NOTE: an invention disclosure has been filed with Clemson University and is being considered for patenting
- NOTE: Lunar Tweel Development – testing design. Four students enrolled (all female) and coached by a graduate student (female)
- NOTE: the team placed 2<sup>nd</sup> in the 2008 SE ASEE design competition (most entries were for senior design projects; team consisted of four freshmen and sophomores)
- NOTE: formerly taught in the ENGR rubric prior to F11

ENGR 490, Product Innovation, (M07)

- NOTE: same course as ME 493 from May 2006 – Offered through General Engineering to support more interdisciplinary activities
- NOTE: One industry sponsor funded the project (\$7,500 collected for the Capstone Foundation Account)

IE 465, *Facilities Planning*, (F09)

- NOTE: co-taught the course with B. Melloy.

ME 202, *Fundamentals of Mechanical Systems*, (S02, F02x2, F03, F04, S05, F06)

- NOTE: a journal paper has resulted from the curriculum development in this class
- NOTE: two conference papers have resulted from the curriculum development in this class

ME 3060 (formerly ME 306), *Fundamentals of Machine Design*, (S03, S04, Su04, S18)

ME 4010 (formerly ME 401), *Introduction to Engineering Design*, (F10, S11, F11, Su13, F13, S14, Su14, F14x2, S15, F15x2, F16x2, F18x3)

ME 402 Coordinator, *Internship in Engineering Design*, (F04, S05, F05, S06, F06, S07, F07, S08, F08, S09, F09, S10, Su10, Su11, Su12)

- NOTE: Traveled to Salt Lake City, UT in Fall 2009 to visit peer institutions to benchmark capstone design courses (BYU, Utah)
- NOTE: Traveled to Boston, MA in Spring 2006 to visit peer institutions to benchmark capstone design courses (BU, WPI, Olin College, MIT).
- NOTE: Fifty-eight industry sponsored projects (~\$430,000 collected for the Capstone Foundation Account).
- NOTE: took an undergraduate student and their design prototype to South Korea for International Capstone Design Fair in 2006, 2007, and 2008 (won second place in 2008)

ME 4020 (formerly ME 402) Project Advisor, *Internship in Engineering Design*, (S02, F03, S04, F04x2, S05, F05x3, S06, F06, S07, F07, S08, F08, S09, F09, S10x2, Su10\*, Su11\*, S12, Su12, F13, S16)

- NOTE: In summer 2010 took 9 undergraduate students to Queretaro, Mexico for six week senior design program jointly with 5 WVU students and 16 Mexican students from UAQ, ITQ, Monterrey Tech, and CICATA. Sponsors from: VRK, Bombardier, CENAM, IMT, CIATEQ, CIAT, Condumex
- NOTE: In Summer 2011 took 13 undergraduate students to Queretaro, Mexico for six week senior design program jointly with 7 WVU students and 20 Mexican students from UAQ, ITQ, Monterrey Tech, CICATA, ITP. Sponsors from: Bombarier, CIATEQ, In-Mec, CENAM, MABE, Condumex, Tremec, Case-New Holland
- NOTE: in Summer 2012 completed the first summer version of ME 402 (capstone project) during the summer with BMW.

ME 415, *Undergraduate Research*, (13 students)

ME 471, *Computer Aided Engineering, Analysis, and Design*, (S04, F08, F10)

ME 4550 (formerly 455), *Design for Manufacturing*, (F05, S07, S08, S09, S10, S11, S12, F13, Su14, Su15, Su16, Su17, Su18)

- NOTE: converted the course to a fully on-line, self-paced course for summer offerings

ME 493, *Independent Studies*, (9 students)

ME 493, *Product Innovation*, (M06, F18)

- NOTE: Michelin considered applying for patents based on the student work in this class.
- NOTE: Two industry sponsors funded the projects (\$10,000 collected for the Capstone Foundation Account)
- NOTE: Course won Innovations in Education Award 2006 (facilitated by Deloitte)

### **Courses Taught (graduate: 7 courses, 40 assignments)**

IE 8930, *Design for Assembly and Manufacturing*, (S14)

- NOTE: the course is developed for on-line delivery

ME 6550 (formerly 655), *Design for Manufacturing* (F13, Su14, Su15, Su16, Su17, Su18) as ME 655 (F05, S07, S08, S09, S10, S11, S12)

ME 671, *Computer Aided Engineering, Analysis, and Design*, (S04, F08)

ME 693, *Product Innovation*, (M06, M07)

- NOTE: Michelin considered applying for patents based on the student work in this class.

- NOTE: this course is being studied for replication in the Electrical, Bio Engineering, and Civil Engineering Departments in various incarnations.
- ME 8700 (formerly 870), *Advanced Engineering Design Methods*, (S06, F08, F09, F10, F17)
- NOTE: one conference paper has resulted from student work in this class
  - NOTE: one journal paper has resulted from student work in this class.
- ME 8720, *Design Automation for Mechanical Engineers*, (S12, S15) as ME 893 (F03, S06, F07)
- NOTE: formerly offered as a special topics course in F03, S06, and F07
- ME 8730, *Research Methods in Design*, (S14, S16, Su17, S18), as ME 873 (F11), as ME 893 (Collaborative Design F02, F05; Coaching F04, F05, F06, F07, S09)
- NOTE: formerly offered as a special topics course in F02, F04, F05, F06, F07, and S09
  - ME 893, *Research Issues in Collaborative Design*, (F02, F05)
    - NOTE: four conferences papers and one journal paper have resulted from student work in this class
  - ME 893, *Graduate Design Coaching*, (F04, F05, F06, F07, S09)
    - NOTE: two conference paper has resulted from student work in this class
    - NOTE: one journal paper has resulted from student work in this class.

### **New Course Development**

AMFG 3800, Introduction to Advanced Manufacturing Systems (gateway course to Advanced Manufacturing Certificate)

IE 8930, Special Topics – Design for Assembly and Manufacturing (S14) – Online course

ME 493/693/893, Special Topics – Product Innovation, May06, May07 (Relocated to ENGR 490 for May07)

ME 893, Special Topics – Collaborative Design Research, F02, F04

ME 893, Special Topics – Design Automation for Mechanical Engineers, F03, S06

ME 893, Special Topics – Design Coach Management, F04, F05, F06, F07, S09.

ME 893, Special Topics – Research Methods in Engineering Design, F11

ME 290, 390, 490 – Creative Inquiry for Mechanical Engineering

ME 872 – Design Automation for Mechanical Engineers

ME 873 – Collaborative Design Research Methods

## **UNIVERSITY AND PUBLIC SERVICE**

### **Committees**

#### *Department:*

Member, Curriculum Committee (2016-present)

Director of Graduate Studies (2014-present)

Member, Departmental Tenure/Promotion/Reappointment Committee (2013-present)

Member, Endowed Chair Review Committee (2014) (elected)

Member, Department Chair Review Committee (2014) (elected)

Member, Curriculum/Laboratory/International Committee (2013-2015)

Chair, Curriculum/Laboratory/International Committee (2010-2012)

Chair, Design and Manufacturing Group (2010-2011) (elected)

Member, Department Chair Advisory Committee (2010-2011) (elected)

Member, Department Faculty Search Committee (2010-2011)

Member, Undergraduate Committee (2008-2012)

Secretary, Departmental (2002-2005)

Member, Awards Committee (2002-2008)

Advisor, ASME Student Chapter, (2002-2003) (co-advised with J. Minor)

Advisor, ASME Student Chapter (2003-2007)

Advisor, ASME Student Chapter (2007-2008) (co-advised with G. Mocko)

#### *College:*

Member, ABET Steering Committee (2016-2017)

Member, Industrial Engineering Department Tenure/Promotion/Reappointment Committee (2014)

Member, CoES Awards Selection Committee (2014)

Chair, Search Committee for Associate Dean of Research (2013) (elected)  
 Member, Dean's Advisory Committee (2013-2015)  
 Member, CoES Curriculum Committee (2010-2012)  
 Member, General Engineering Freshman Advisory Committee (2010-2012)  
 Member, McQueen-Quattlebaum Award Selection Committee (2006)

*University:*

Facilitator, Trained Conflict Coach and Mediator (2018-present) (selected)  
 Senator, Faculty Senate (2017-present) (elected)  
 Lead Senator for CECAS (2017-present) (elected)  
 Member, President's Council for Diversity and Inclusion (2017-present)  
 Member, Graduate Council (2016-present) (elected)  
 Member, Assessment Committee (2015-present) (elected)  
 Member, Faculty Senate Research Committee (2018-present)  
 Member, Review Committee for Interim Associate Provost Appointments (2018) (selected)  
 Member, Search Committee for Associate Provost for Faculty Affairs (2018) (selected)  
 Chair, Faculty Senate Research Committee (2017-2018)  
 Mentor, Trailblazers: Provost's Mentoring Initiative (2017-2018) (selected)  
 Mentor, University Mentor Circle (2016-2017)  
 Senior Mentor, Tiger Advocates (2017-present) (selected)  
 Member, Provost's Safety Culture Taskforce (2016-present)  
 Member, Grievance Board (2016-2018) (elected)  
 Senator, Faculty Senate (2013-2016) (elected)  
 Chair, Faculty Senate Finance Committee (2015-2016)  
 Chair, University Oversight and Budget Committee (2015-2016)  
 Member, Faculty Senate Executive Advisory Committee (2015-2016)  
 Member, Faculty Senate Sub-Committee on Research (2013-2015)  
 Member, University Research Committee (2011-2014) (elected)  
 Member, Graduate Council (2011-2012) (elected)  
 Member, Graduate College Curriculum Committee (2011-2012) (elected)  
 Member, Freshman/Sophomore Committee (2010-2011) (elected)

**Other Service**

ABET Program Evaluator (2014-present). Reviewed small regional, Ivy, large state, HBCU, and commuter programs (4 programs as PEV and 1 program as observer).  
 External Tenure/Promotion evaluator (2012-present) for: University of Idaho, Washington State University, Colorado School of Mines, Bucknell University, The Ohio State University, University of Louisville, University of Buffalo, Oregon State University, Pennsylvania State University, University of Arkansas, University of South Carolina, University of Calgary, Texas A&M.  
 Served as an external Ph.D. dissertation reviewer for Srikanth Bansal of the Indian Institute of Technology-Kanpur in spring 2006. Thesis topic was developing a feature based fixture recognition system.  
 Senior Design Lab Development/Coordinator, Established a dedicated lab for the senior design course sequence (EIB 252/253: The WarRoom). Equipped lab with computers, software, hand tools, library materials, and dedicated teaching assistant for the lab. (2004-2010)  
 CAD Software Coordinator for Department, Arranged for the purchase of UGS (NX, IDEAS, SolidEdge), CATIA, SolidWorks for departmental educational use (2003-2008)  
 MSDNAA Software Coordinator for Department, Arranged for the registration and support of Microsoft Development Package for Academic Institutions as incorporated into departmental educational use (2006-2010)  
 Advisor, American Society of Mechanical Engineers, Student Chapter (2004-2007)  
 Co-Faculty Advisor, American Society of Mechanical Engineer, Student Chapter (2002-2003, 2008)  
 CAD/RP lab development, developed a four week lab sequence (jointly with Georges Fadel) that introduces Sophomore ME students to concepts and principles associated with CAD, Rapid Prototyping, Metrology, and Design of Experiments (2003-2006)  
 Faculty Coach, Human Powered Vehicle, ASME Clemson (2002)

**MISCELLANEOUS****Research Collaborators at Clemson (\*no longer at Clemson)**

ME: Drs. Biggers, Fadel, Grujicic (deceased), Huang\*, Joseph, Mocko, Pataky, Saylor, Thompson, Turner, Wagner, Wood\*

AuE: Drs. Kurfess\*, Mears, Ziegert\*

BioE: Dr. Desjardins

CE: Drs. Ravichandran, Atamturktur\*

ChemE: Dr. Kitchens

CS: Drs. Goddard, Hodges, Apon

Gen. Engr: Dr. Ohland\*

IE: Drs. Gramopadhye, Greenstein, Kurz, Mayorga\*, Stanley

MSE: Drs. Blouin, Cole\*, Rack\*

Education: Drs. Linnell\*, Switzer, Boyer

Psychology: Dr. Shuffler, Switzer

**General Contributions**

CECAS – high school summer camp, 2018, provided a one-day design workshop to 16 high school campers (A. Patel)

Clemson University Post-Doctoral Association, 2016, invited as guest panelist to annual dinner (September 23, 2016)

Clemson Elementary, 2011, “Future Engineers Club”, coordinated an afterschool club activity at the elementary school for 20 fifth graders and graduate students as they design and build wind tunnels for use in the elementary school classrooms (E. Namouz, S. Joshi, M. Miller, C. Shorts).

Boy Scouts, 2011, Invention Merit Badge Workshop, coordinated a workshop on engineering design for 19 Boy Scouts and leaders on Saturday morning (1 day) (students: P. Mehta, J. Owensby, T. Hess, A. Shanthakumar, V. Rayate)

Cub Scouts, 2011, Blue and Gold Banquet guest speaker on engineering and space exploration. Gave a talk with prototype lunar wheels to Cub Scouts from 1<sup>st</sup> – 7<sup>th</sup> grade (1 day, 2011) (student: J. Mathieson)

Clemson Alumni Association “Bring Your Daughter to Clemson Weekend” – offered two Reverse Engineering Workshops for girls 5<sup>th</sup>-11<sup>th</sup> grade (1 day, 2008) (students: M. Orr, A. O’Dell, T. Camp)

Clemson Elementary “Math Superstars” – volunteer to work weekly with 1<sup>st</sup>-3<sup>rd</sup> graders on extra math projects and assignments (2007-2010)

Clemson Elementary “Future Engineers” – coordinated a 8 week sequence of reverse engineering consumer products for the 13 student club meeting every week after school (2009-2010) (students: B. Caldwell, B. Morkos, S. Joshi)

Clemson Elementary “Paws for Safety” – Demonstrated the working cold chamber Tweel test rig that was designed and built for Lunar Tweel projects (1 day, 2008) (students: A. Kanda, S. Miller, G. Kauffman)

Clemson Elementary “Space Week” – Gave a teaching unit to first grade class on space exploration and demonstrated the active work on the Lunar Tweel (1 day, 2008) (students: M. Orr)

Clemson Elementary, 2007, Gave a talk to Kindergarten class on space exploration. Used footage from the JPL/Michelin Tweel project to interest students in space (1 day; 2007)

Clemson Girl Scouts Weekend, 2006, Introduced girl scouts (girls 12-18) to concepts of mechanical engineering (what is an engineer, how does this differ from scientists, c-sketch, morphological charts, and gallery method as tools for design) (1 day; 2006)

Reverse Engineering for Elementary Schools, 2005, Developed and conducted a 5 week module on reverse engineering (principles, tools, and methods) to Upper Elementary at Clemson Montessori in Spring 2005. Module included undergraduate and graduate student participation. NOTE: This module has been requested by elementary and high schools in Greenville and Anderson and is under further development.

University Lutheran Church Summer Children’s Program, 2005, provided a lab tour and explanation of mechanical engineering to 4-12 year olds.

Cub Scouts, 2005, Introduced boys to engineering design principles and a specific idea generation method (Collaborative Sketching). NOTE: an example is included in supplemental documentation.

Central Arizona Regional Science and Engineering Fair 2000 – Judged local secondary school student engineering and science projects. (2000)

Coordinated Panel Discussion – “Technology Transfer from Academia to Industry – How to Leverage Your Research into Profits”. Responsible for garnering funding to bring an international expert on technology transfer. Primary contact with entire panel of experts. Developed format and acted as MC for the discussion session. Compiled and edited panelist paper submissions for Preparing Future Faculty Occasional Series. (2000)

Panelist for the “Success in Graduate Study Workshop” – ASU Graduate College. Discussed experiences as a graduate student at ASU with new ASU doctoral students. (2000)

Minority Engineering Program – tutored minority engineering students in statics, dynamics, physics, and calculus. (1998-1999)

Mathematics, Engineering, and Science Achievement (MESA) – worked with middle school and high school science classes exploring science and engineering projects through extra-curricular activities. Built a “wind tunnel” for middle school students and experimented with the forces of flight. Helped the teachers integrate science projects into their curriculum. Helped organize MESA Day, an academic outreach program at Tribal American reservation schools (1998-1999)

Dean’s Curriculum Committee, University of Missouri – First student representative on committee. Worked in development of new courses, degrees, and ABET certification. (1996-1997)

Engineering Graduate Council, University of Missouri – Founding member of graduate engineering student council. Organized to voice concerns in college budget, faculty hunts, curriculum development, and other issues. (1995-1997)

### **Language**

French – Writing (intermediate); Reading (intermediate); Speaking (moderate) (4 years HS, 2 years college, **11 months of residency** in Grenoble 2012-2013)

Spanish – Writing (low); Reading (low); Speaking (low) (1 year HS, **4 months residency** in Quertaro in 2010 and 2011)

Japanese – Writing (low); Reading (low); Speaking (low) (1 year college; **7 months residency** in Fujisawa in 1989)

*September 26, 2018*