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**Principal Lecturer**  
**School of Mechanical Engineering**  
**Georgia Institute of Technology**  
**07-15-2021**

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**Raghu Pucha**  
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**The George W. Woodruff School of Mechanical Engineering**  
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**I. Earned Degrees**

Doctor of Philosophy  
Aerospace Engineering  
Indian Institute of Science, Bangalore, India  
12/01/1995  
Advisor: Prof. A.V.Krishnamurty

Master of Science  
Aerospace Engineering  
Madras Institute of Technology, India  
01/01/1990  
Advisor: Prof. N.S.Venkataraman

Bachelor of Science  
Civil Engineering  
Nagarjuna University, India  
01/01/1988

**II. Employment History**

Senior Lecturer  
Georgia Institute of Technology  
11/01/2015 to Present

Academic Professional  
Georgia Institute of Technology  
08/01/2013 to 10/01/2015

Senior Research Engineer  
Georgia Institute of Technology  
07/01/2005 to 07/01/2013

Post-Doctoral Researcher  
Georgia Institute of Technology  
01/01/2000 to 06/01/2005

Post-Doctoral Researcher  
Purdue University, West Lafayette, IN  
09/01/1997 to 12/01/1999

Research Associate  
Nanyang Technological University, Singapore  
06/01/1996 to 08/01/1997

### III. Honors and Awards

1. USG Regents' Scholarship of Teaching & Learning Award : 2020 Georgia Tech Nominee
2. CTL [Scholarship of Teaching and Learning Award 2020](#), Georgia Tech
3. CTL [Geoffrey G. Eichholz Faculty Teaching Award 2015](#), Georgia Tech.
4. Featured in GT News: [A Tale of Two Teachers](#)
5. The Whistle 2015 : [Putting 'TECH' in 'Teaching'](#)
6. 1st place, best undergraduate research poster at UROP Spring 2013 Symposium (for group of mentored UG research students)
7. CTL [Undergraduate Educator Award 2012](#), Georgia Tech.
8. Acknowledged by Dr. G.P. "Bud" Peterson – Past President, Georgia Institute of Technology, Dean Griffin Day Talk, Friday, April 23, 2010: [People like Raghupathi are leaders](#)
9. Senior Member - American Institute of Aeronautics and Astronautics (AIAA)
10. Senior Member - Institute of Electrical and Electronics Engineers (IEEE)
11. Cover Image of Research Work, IEEE Transactions on Components and Packaging Technologies, March 2007. Vol. 30, No. 1, 2007.
12. 1st place in the 2009 ASEE-SE Student Poster Competition Undergraduate Research Division (Student: John Semmens: Designing DNA Nanostructures Using Analytical and NanoCAD Tools)
13. Honored with many "Excellence in Teaching" recognition certificates from the Center for Teaching and Learning (CTL) at Georgia Institute of Technology.
14. Invited to the "Dean Griffin Day" program many times, in honor of outstanding contributions to the Georgia Tech Community through teaching. Hosted by Center for Enhancement of Teaching and Learning, and Georgia Tech Alumni Student Ambassadors, Georgia Tech.

### IV. Education and Mentorship

#### A. Courses Taught (Last Six Years)

Semester	Year	Course Number	Course Title	No. of Students
Summer	2021	ME 4042A	Computer Graphics & Cad	20
Summer	2021	MLDR 8803QML (Co-instructor: Dr. Chuck Zhang)	Foundational Topics in Discrete Product Development and Design for Manufacturing	7
Spring	2021	ME 1770 B,D,G&H	Intro to Engr Graphics	212
Fall	2020	ME 1770 B, D & H	Intro to Engr Graphics	143
Fall	2020	ME 3210	Design and Manufacture	56
Summer	2020	ME 4042A	Computer Graphics & Cad	27
Summer	2020	MLDR 8803QML (Co-instructor: Dr. Chuck Zhang)	Foundational Topics in Discrete Product Development and Design for Manufacturing	7
Spring	2020	ME 1770 A,D,E&I	Intro to Engr Graphics	118
Fall	2019	ME 1770 D,H & I	Intro to Engr Graphics	125
Fall	2019	COE 2001J	Statics	59
Summer	2019	COE 3001B	Deformable Bodies	48
Summer	2019	MLDR 8803QML (Co-instructor: Dr. Chuck Zhang)	Foundational Topics in Discrete Product Development and Design for Manufacturing	13
Summer	2019	COE 3001QUP	Deformable Bodies	47

Spring	2019	ME 1770 A,D,E & I	Intro to Engr Graphics	135
Fall	2018	ME 1770 H & I	Intro to Engr Graphics	83
Fall	2018	COE 2001L	Statics	57
Summer	2018	ME 4041 A	Computer Graphics & Cad	17
Summer	2018	MLDR 8803QML (Co-instructor: Dr. Chuck Zhang)	Foundational Topics in Discrete Product Development and Design for Manufacturing	14
Spring	2018	ME 1770 B & D	Intro to Engr Graphics	83
Spring	2018	ME 6124	Finite Element Method	61
Fall	2017	ME 1770 B,H & I	Intro to Engr Graphics	123
Fall	2017	COE 3001H	Deformable Bodies	62
Summer	2017	COE 3001B	Deformable Bodies	63
Summer	2017	ME 4041 A	Computer Graphics & Cad	13
Spring	2017	ME 1770 A,B & I	Intro to Engr Graphics	130
Fall	2016	ME 1770 A, B, H & I	Intro to Engr Graphics	182
Fall	2016	ME 4698	Research Assistantship	1
Fall	2016	ME 4699	Undergraduate Research	4
Spring	2016	ME 1770 A, B, D & I	Intro to Engr Graphics	185
Spring	2016	ME 4698	Research Assistantship	2
Spring	2016	ME 4699	Undergraduate Research	4
Spring	2016	ME 2699	Undergraduate Research	1
Spring	2016	ME 4699	Undergraduate Research	1
Summer	2016	ME 2699	Undergraduate Research	1
Summer	2016	ME 4699	Undergraduate Research	1
Summer	2016	ME 4041A & B	Computer Graphics & Cad	22
Fall	2015	ME 2698	Research Assistantship	1
Fall	2015	ME 4699	Undergraduate Research	5
Fall	2015	ME 4698	Research Assistantship	1
Fall	2015	ME 1770 A, B, H & I	Intro to Engr Graphics	191
Spring	2015	ME 1770 E, F & G	Intro to Engr Graphics	132
Spring	2015	ME 4698	Research Assistantship	4
Spring	2015	ME 4699	Undergraduate Research	2
Summer	2015	ME 4041 A & B	Computer Graphics & Cad	20
Summer	2015	ME 4698	Research Assistantship	1
Summer	2015	ME 4699	Undergraduate Research	2
Summer	2015	ME 4699	Undergraduate Research	2
Summer	2015	ME 2699	Undergraduate Research	1

## B. Research Advising and Guidance

### Ph.D. Students

*Mentored through research collaboration with other Faculty*

Rui Liu: Graduated in Fall 2014

Atiq Bhuiyan: Graduated in Spring 2014

### M.S. Students

*Mentored through research collaboration with other Faculty*

1. KJ Lee: Graduated in Fall 2005
2. Manoj Damani: Graduated in Summer 2004
3. Krsihna Tunga: Graduated in Spring 2004
4. Shabsikanth Hegde: Graduated in Spring 2003
5. Gyan Ramakirshna: Graduated in Summer 2002
6. James Pyland: Graduated in Spring 2002

### Undergraduate Students

*Undergrad research option thesis advisor*

1. Wonsup Song: Spring 2014 – Spring 2016 (Thesis: *Percolation, Electrical Conductivity, and EMI Shield Analysis of CNT Composites*)
2. Johnny Worthy: Summer 2011 – Spring 2013 (Thesis: *Design Tools for Simulation of Nanocomposite Material Properties*)

*Mentored through UG research for credit, research for pay, and other UG research awards*

1. Anuja Kandare (Spring 2017 – Fall 2019)
2. William Chen (Summer 2016 – Fall 2019), Jaesoek Cha (Fall 2016), Jieun Seong (Summer 2016 – Fall 2016), Kwon Lee (Spring 2016) Ivan Chen (summer 2016 – Fall 2016), Vikram Krishnaswamy (Spring 2015 – Spring 2016), Miles Chan (Spring 2015 – Spring 2016)
3. Robert Ashcom (Summer 2015) , Walter Scott (Summer 2015 – Spring 2016), Kwon Lee (Summer 2015 – Fall 2015), Rebecca Withers and Yash Gore (Summer 2015).
4. Kristin Hansen (Spring 2014), Hannah Littmann (Spring 2014), Patrick Younes (Spring and Fall 2014), Yue Chu (Summer and Fall 2014), Maegan Tucker (Summer 2014), Moriah Mattson (Summer 2014), Thomas Ming (Summer and Fall 2014), Amit Agarwal (Summer 2014), Alejandro Boxill (Fall 2014), Rahul Dungarwal (Fall 2014), Izaak Lakhia (Fall 2014), Scott Wagner (Fall 2014)
5. Dhruv Mehta, Summer 2013; John Hooie, Summer 2013; Hannah Littman, Summer 2013; Joshua Price, Summer 2013; Shadi Renno, Fall 2013; Kristin Hansen, Fall 2013; Johnny Worthy: Summer 2011 – Spring 2013; Ravi Haskar: Spring 2013; Davis Hoffman: Spring 2013;
6. Joshua Price: Fall 2012; Prakar Srivatsav: Fall 2012; Bob Palmer: Fall 2011 and Spring 2012; Nicole Wisner: Spring 2012; Tapan Asgoankar: Spring 2012; Panos Markou: Spring 2012; Kylie Alea: Spring 2012;
7. Parth Jariwala, NASA Summer Fellowship – Summer 2011; Akhil Modi: Summer 2011; Alexis Noel: Spring 2011; Siddarth Gangopadhyay: Spring 2011; Akshay Saxena: Spring 2011;
8. Ajeya Karajgikar: Spring 2010 ; Kavneet Seth: Spring 2010, Summer 2009, Fall 2008; Sahil Batta: Fall 2009; Adnan Hannan: Summer 2009 ; Yasaman Nemat-bakhsh: Spring 2009; John Semmens: Spring 2009; Rob Parrish: Fall 2008

*Mentored through Summer Undergraduate Research REVAMP award, GTMI, Georgia Tech.*

1. Summer 2021 : Devon Phelps, Georgia Tech
2. Summer 2019 : Esmeralda Reyes, Kennesaw State University
3. Summer 2016 : Alisha Whitehead, The University of Texas at Dallas
4. Summer 2016 : Richa Prasad, Purdue University
5. Summer 2015 : Bryson Sin, Virginia Commonwealth University
6. Summer 2014 : Dominic Critchlow, Austin Peay State University

*Mentored through SURE program, Georgia Tech.*

1. Summer 2018 : Michael Johnson, Fort Valley State University)
2. Summer 2017 : Samuel Dean, University of Central Florida)
3. Summer 2012 : Orlando J. Lopez, University of Puerto Rico)

**C. Educational Innovations and Other Contributions**

- 1) Students construct knowledge through gathering and synthesizing information, and integrating it with the general skills of inquiry, communication, critical thinking, and problem solving. This process enables students to take ownership of their learning. Freshman engineering core course ME 1770: *Introduction to Engineering Graphics and Visualization* was revamped from lecture-centered time-bound exam based teaching approach to learning-centered project-based teaching/learning course. (see Pucha R; Utsching T (2012). *Learning-Centered Instruction of Engineering Graphics for Freshman Engineering Students*. The Journal of STEM Education: Innovations and Research 13(4), pp. 24 - 33)
  
- 2) Teaching / Learning methodologies have traditionally seen content and process as competing priorities. Integrating content and process together in the teaching/ learning activities offers the opportunity to increase students' experience with authentic activities while also achieving deeper content understanding. Prior knowledge activation also has strong facilitative effects on learning. Prior knowledge provides learners with a relevant context in which new information can be integrated. Core course ME 3180: Machine Design, was taught with process-oriented CAD activities students learned from ME 1770. (see Pucha RV; Utschig TT; Liang SY (2013). Use of process-oriented approaches in content-intensive courses: Some insight in teaching / learning of machine design. ASEE Annual Conference and Exposition, Conference Proceedings).
  
- 3) In cornerstone design courses, design thinking skills that support an iterative loop of divergent (creative) and convergent (critical) thinking through project-based learning environments are needed in addition to instruction of graphics and visualization tools. Critical thinking skills have a more established history in academia and in engineering programs, most specifically for teaching problem solving. Universities teach creative thinking skills to a much lesser extent, perhaps because of a lack of understanding of how we define creativity. There are several open research questions on design pedagogy and how effective inquiry, the systematic interplay between divergent and convergent questions that are taught and promoted as part of engineering education. Creative and critical thinking interventions in individual projects with authentic activities for improved learning were introduced in freshman engineering core course ME 1770: Introduction to Engineering Graphics and Visualization. See
  - i. Pucha, RV, Newton, SH., Alemdar, M., and Utschig, TT (2016) *Process-Oriented Intervention and Reflection Strategies for Creativity in Student Design Projects*. 4th international conference on design creativity, Atlanta, GA.
  - ii. Pucha R; Utschig TT; Newton SH; Alemdar M; Moore R; Noyes CR (2016). *Critical and creative thinking activities for engaged learning in graphics and visualization course*. ASEE Annual Conference and Exposition, Conference Proceedings.
  - iii. Pucha, RV; Levy,B; Linsey,J; Newton, SH; Alemdar, M; and Utschig, T. (2017). *Assessing Concept Generation Intervention Strategies for Creativity Using Design Problems in a Freshman Engineering Graphics Course*, ASEE Annual Conference & Exposition.

- 4) In January 2016, Georgia Tech launched a campus-wide academic initiative, “Center for Serve-Learn-Sustain”, aimed at preparing undergraduate students in all majors to use their disciplinary knowledge and skills to contribute to the major societal challenge of creating sustainable communities. The initiative collaborates with faculty in all six Georgia Tech colleges to develop courses and co-curricular opportunities that will help students learn about sustainability and community engagement and hone their skills by engaging in real-world projects with nonprofit, community, government, and business partners. A Socio-technical project-based learning model is currently used in a freshman-engineering course, ME 1770. Contextualized design problems are assigned to engage students throughout the course. See
- i. Pucha, R., Dosa, K., Newton, S., Alemdar, M., Yow, R., and Hirsch, J. “Integrating Sustainability into a Freshman Engineering Course Through an Institute-level Initiative: A Teaching-Learning Model with Authentic Activity and Context”. In *Integrating sustainable development into the curriculum: Vol.18. Innovations in Higher Education Teaching and Learning Series*. Patrick Blessinger (Ed). Emerald Publishing Limited. 18 Mar 2020. ISBN: 9781787699427.
  - ii. Pucha, R., Newton, S., and Alemdar, M. (2019). “Freshman Engineering Students See Value in Sustainability-themed Project-based Learning”. Presented at AASHE Conference & Expo Oct.27 – Oct.30, Spokane, WA, USA.
  - iii. Pucha, R., Dosa, K., Newton, S., and Alemdar, M. (2019). “External Representation Design-for-Sustainability Intervention in an Engineering Graphics Course”. *Proceedings of ASEE Annual Conference & Exposition*. June 16 – June 19, Tampa, FL, USA.
  - iv. Pucha, RV., Thurman, CJ; Yow,R; Meeds, CR; and Hirsch, J (2018). *Engagement in Practice: Socio-technical Project-based Learning Model in a Freshman Engineering Design Course*. ASEE Annual Conference & Exposition.
  - v. Hirsch,J; Yow,R; O’Brien,S; Pucha, RV; Wisdom,N; Realff, M; Zegura, E (2017) *Socio-technical Approaches to Sustainable Community Development in Atlanta*. Atlanta Studies Symposium, Apr.26.

#### D. Educational Administration and Leadership

**ME 1770 Course Coordinator (2012 to Present):** ME 1770: *Introduction to Engineering Graphics and Visualization* is a freshman-engineering course. When Georgia Tech converted from quarter to semester curricula in 1999, the college of engineering created a three credit hour introductory engineering graphics course for undergraduates. In 2002, the course was revised using the “backward design” approach with formative and summative assessments in lecture and lab activities. In later years, project-based and learning-centered instructional approaches using real-world engineering design problems with creative and critical skills were introduced. This core course for mechanical and aerospace engineering students is offered in all three semesters with two to four instructors teaching nine to ten sections and around ten TAs each in Spring and Fall. The course coordinator is responsible for (i) communicating with AE and ME schools for the allocation of TAS (ii) assigning TAs for each section and office

hours (iii) organizing weekly meetings with all faculty and TAs to maintain consistency in curriculum topics (iv) discussing student learning process and TAs responsibilities.

## V. Research Scholarship and Creative Activities

### A. Publications

#### Book Chapters

[1] Pucha, R., Dosa, K., Newton, S., Alemdar, M., Yow, R., and Hirsch, J. "Integrating Sustainability into a Freshman Engineering Course Through an Institute-level Initiative: A Teaching-Learning Model with Authentic Activity and Context". ***Integrating sustainable development into the curriculum: Vol.18***. Innovations in Higher Education Teaching and Learning Series. Patrick Blessinger (Ed). Emerald Publishing Limited. 18 Mar 2020. ISBN: 9781787699427.

[2] (2008). Mixed-Signal Package Reliability. *Introduction to System-on-Package (SOP)* (pp. 443 - 487) by McGraw-Hill, NY.

[3] (2004). Novel board material technology for next-generation microelectronic packaging. *Developments in Dielectric Materials and Electronic Devices, Ceramic Transactions*, 18(21), (pp. 371 - 381)

[4] (2004). Materials and Mechanics Challenges in SOP-based Convergent Microsystems. *Micromaterials and Nanomaterials* (pp. 16 - 29)

#### Journal Articles

- 1) Demir, K; Sukumaran, V; Sato, Y; Amrani, A.E; Ramachandran, K; Pucha, R.V; Pulugurtha, M; Sundaram, V; Tummala, R. (2018). *Reliability of fine-pitch through-vias in glass interposers and packages for high-bandwidth computing and communications*. Journal of Materials Science: Materials in Electronics, (pp 1-12)
- 2) Song W; Krishnaswamy V; Pucha RV (2016). *Computational homogenization in RVE models with material periodic conditions for CNT polymer composites*. 137 Composite Structures, (pp. 9 - 17)
- 3) Bhuiyan, M. A., Pucha, RV., and Kalaitzidou, K (2016). *3D RVE models able to capture and quantify the dispersion, agglomeration and orientation state of CNT in CNT/PP nanocomposites*, Frontiers in Materials (Composite Materials), 3, (pp.1-12)
- 4) Pucha RV; Worthy J (2014). *Representative volume element-based design and analysis tools for composite materials with nanofillers*. 48 Journal of Composite Materials, (17) (pp. 2117 - 2129)
- 5) Liu R; Melkote S; Pucha R; Morehouse J; Man X; Marusich T (2013). *An enhanced constitutive material model for machining of Ti-6Al-4V alloy*. 213 Journal of Materials Processing Technology, (12) (pp. 2238 - 2246)
- 6) Bhuiyan MA; Pucha RV; Worthy J; Karevan M; Kalaitzidou K (2013). *Understanding the effect of CNT characteristics on the tensile modulus of CNT reinforced polypropylene using finite element analysis*. 79 Computational Materials Science, (pp. 368 - 376)



- 7) Bhuiyan MA; Pucha RV; Worthy J; Karevan M; Kalaitzidou K (2013). *Defining the lower and upper limit of the effective modulus of CNT/polypropylene composites through integration of modeling and experiments*. 95 Composite Structures, (pp. 80 - 87)
- 8) Pucha R; Utsching T (2012). *Learning-Centered Instruction of Engineering Graphics for Freshman Engineering Students*. The Journal of STEM Education: Innovations and Research 13(4), (pp. 24 - 33)
- 9) Bhuiyan MA; Pucha RV; Karevan M; Kalaitzidou K (2011). *Tensile modulus of carbon nanotube/polypropylene composites - A computational study based on experimental characterization*. 50 Computational Materials Science, (8) (pp. 2347 - 2353)
- 10) Tummala RR; Sundaram V; Raj PM; Pucha R; Bandyopadhyay T; Kumbhat N; Sridharan V; Walden-Monroe T; Sutter D (2010). *Georgia Tech's Vision for Ultra-miniaturized Device and Systems Packaging*. 14 (pp. 14 - 18)
- 11) Karevan M; Pucha RV; Bhuiyan MA; Kalaitzidou K (2010). *Effect of Interphase Modulus and Nanofiller Agglomeration on the Tensile Modulus of Graphite Nanoplatelets and Carbon Nanotube Reinforced Polypropylene Nanocomposites*. 11 (4) (pp. 325 - 331)
- 12) Kim I; Pucha RV; Peak RS; Sitaraman SK (2008). *Development of reliability allocation and assessment algorithms for designing multilevel microelectronic systems*. 5 Journal of Microelectronics and Electronic Packaging, (1) (pp. 12 - 25)
- 13) Kumbhat N; Raj PM; Pucha RV; Tsai JY; Atmur S; Bongio E; Sitaraman SK; Tummala RR (2007). *Novel ceramic composite substrates for high-density and high reliability packaging*. 30 IEEE Transactions on Advanced Packaging, (4) (pp. 641 - 653)
- 14) Lee KJ; Damani M; Pucha RV; Bhattacharya SK; Tummala RR; Sitaraman SK (2007). *Reliability modeling and assessment of embedded capacitors in organic substrates*. 30 IEEE Transactions on Components and Packaging Technologies, (1) (pp. 152 - 162)
- 15) Kumbhat N; Raj PM; Pucha RV; Sundaram V; Bongio E; Sitaraman S; Tummala RR (2007). *A novel low CTE, high stiffness ceramic composite core*. 18 Circuits Assembly, (1) (pp. 28)
- 16) Varadarajan MG; Lee RJ; Bhattacharya SK; Pucha R; Tummala RR; Sitaraman S (2006). *Printed circuit board (PCB) miniaturization by embedded passives and sequential build-up (SBU) process methodology*. 86 Journal of the Indian Institute of Science, (6) (pp. 639 - 654)
- 17) Hegde S; Pucha RV; Sitaraman SK (2004). *Enhanced reliability of High-Density Wiring (HDW) substrates through new base substrate and dielectric materials*. 15 Journal of Materials Science: Materials in Electronics, (5) (pp. 287 - 296)
- 18) Pucha RV; Hegde S; Damani M; Tunga K; Perkins A; Mahalingam S; Ramakrishna G; Lo GC; Klein K; Ahmad J (2004). *System-level reliability assessment of mixed-signal convergent microsystems*. 27 IEEE Transactions on Advanced Packaging, (2) (pp. 438 - 452)

- 19) Pucha RV; Tunga K; Pyland J; Sitaraman SK (2004). *Accelerated thermal cycling guidelines for electronic packages in military avionics thermal environment*. 126 Journal of Electronic Packaging, Transactions of the ASME, (2) (pp. 256 - 264)
- 20) Pucha RV; Ramakrishna G; Mahalingam S; Sitaraman SK (2004). *Modeling spatial strain gradient effects in thermo-mechanical fatigue of copper microstructures*. 26 International Journal of Fatigue, (9) (pp. 947 - 957)
- 21) Pyland J; Pucha RV; Sitaraman SK (2002). *Thermomechanical reliability of underfilled BGA packages*. 25 IEEE Transactions on Electronics Packaging Manufacturing, (2) (pp. 100 - 106)
- 22) Pucha RV; Pyland J; Sitaraman SK (2001). *Damage metric-based mapping approaches for developing accelerated thermal cycling guidelines for electronic packages*. 10 International Journal of Damage Mechanics, (3) (pp. 214 - 234)
- 23) Zavattieri PD; Raghuram PV; Espinosa HD (2001). *Computational model of ceramic microstructures subjected to multi-axial dynamic loading*. 49 Journal of the Mechanics and Physics of Solids, (1) (pp. 27 - 68)
- 24) Raghuram PV; Krishna Murty AV (1999). *High precision coupled bending-extension triangular finite element for laminated plates*. 72 Computers and Structures, (6) (pp. 763 - 777)
- 25) Raghuram PV (1995). *A high precision thickness-stretch deformation element for the analysis of symmetric laminates under extension*. 2 Mechanics of Composite Materials and Structures, (3) (pp. 181 - 202)
- 26) Govindarajan R; Krishna Murty AV; Vijayakumar K; Raghuram PV (1993). *Finite element estimation of elastic interlaminar stresses in laminates*. 3 Composites Engineering, (5) (pp. 451 - 466)

#### Conference Presentation with Proceedings (Refereed)

- 1) Pucha, R., Newton, S., Alemdar, M., Hull, R.A., and Bhagat.A (2020). *Contextualized design projects in graphics and visualization course: Student perceptions and sustainability systems-thinking knowledge*. ASEE Annual Conference & Exposition. June 21 – June 24.
- 2) Pucha, R (2020). *Creative and Critical Thinking Interventions with Context in a Freshman Design Course*. USG Teaching and Learning Conference, Apr.7 – Apr.11, Athens, GA, USA
- 3) Pucha, R., Newton, S., and Alemdar, M. (2019). *Freshman Engineering Students See Value in Sustainability-themed Project-based Learning*. Presented at AASHE Conference & Expo Oct.27 – Oct.30, Spokane, WA, USA.
- 4) Pucha, R., Dosa, K., Newton, S., and Alemdar, M. (2019). *External Representation Design-for-Sustainability Intervention in an Engineering Graphics Course*. Proceedings of ASEE Annual Conference & Exposition. June 16 – June 19, Tampa, FL, USA.

- 5) Pucha, R.V; Chen, W; and Kandare, A. (2019). *RVE Models with Various Filler Morphology for What-if Analysis of Random Heterogeneous Materials*. Proceedings of the American Society for Composites—Thirty-fourth Technical Conference. Sept 23 – Sept 25, Atlanta, GA, USA.
- 6) Pucha, RV., Thurman, CJ; Yow,R; Meeds, CR; and Hirsch, J (2018). *Engagement in Practice: Socio-technical Project-based Learning Model in a Freshman Engineering Design Course*. Proceedings of ASEE Annual Conference & Exposition. June 24 – June 27, Salt Lake City, UT, USA.
- 7) Pucha, RV; Levy,B; Linsey,J; Newton, SH; Alemdar, M; and Utschig, T. (2017). *Assessing Concept Generation Intervention Strategies for Creativity Using Design Problems in a Freshman Engineering Graphics Course*, Proceedings of ASEE Annual Conference & Exposition. June 25 – June 28, Columbus, OH, USA.
- 8) Hirsch,J; Yow,R; O'Brien,S; Pucha, RV; Wisdom,N; Realff, M; Zegura, E (2017) *Socio-technical Approaches to Sustainable Community Development in Atlanta*. Atlanta Studies Symposium, Apr.26.
- 9) Hilton E, Li W, Newton SH, Alemdar M, Pucha R, Linsey J. (2016). *The Development and Effects of Teaching Perspective Free-Hand Sketching in Engineering Design*. Proceedings of ASME. International Design Engineering Technical Conferences. August 21 – 24. Charlotte, NC, USA. doi:10.1115/DETC2016-60250.
- 10) Pucha, RV, Newton, SH., Alemdar, M., and Utschig, TT (2016) *Process-Oriented Intervention and Reflection Strategies for Creativity in Student Design Projects*. Proceedings of 4th international conference on design creativity, Nov.2 – Nov.4, Atlanta, GA.
- 11) Pucha R; Utschig TT; Newton SH; Alemdar M; Moore R; Noyes CR (2016). *Critical and creative thinking activities for engaged learning in graphics and visualization course*. Proceedings of ASEE Annual Conference & Exposition. June 26 – June 29, New Orleans, LA, USA.<https://www.asee.org/public/conferences/64/papers/16041/view>
- 12) Demir K; Gandhi S; Ogawa T; Pucha R; Smet V; Sundaram V; Raj PM; Tummala R (2015). *First demonstration of copper-plated through-package-via (TPV) reliability in ultra-thin 3D glass interposers with double-side component assembly*. Proceedings - Electronic Components and Technology Conference (pp. 666 - 671)
- 13) Demir K; Armutlulu A; Tong J; Pucha R; Sundaram V; Tummala R (2014). *First demonstration of reliable copper-plated 30µm diameter through-package-vias in ultra-thin bare glass interposers*. Proceedings - Electronic Components and Technology Conference (pp. 1098 - 1102)
- 14) Bhuiyan A; Pucha RV; Kalaitzidou K (2013). *Characterization of cnt orientation and diameter distribution in CNT/polymer composites by image analysis*. Annual Technical Conference - ANTEC, Conference Proceedings (pp. 2024 - 2027)
- 15) Pucha RV; Utschig TT; Liang SY (2013). *Use of process-oriented approaches in content-intensive courses: Some insight in teaching / learning of machine design*. ASEE Annual Conference and Exposition, Conference Proceedings

- 16) Demir K; Ramachandran K; Sato Y; Chen Q; Sukumaran V; Pucha R; Sundaram V; Tummala R (2013). *Thermomechanical and electrochemical reliability of fine-pitch through-package-copper vias (TPV) in thin glass interposers and packages*. Proceedings - Electronic Components and Technology Conference (pp. 353 - 359)
- 17) Mishra D; Raj PM; Khan S; Kumbhat N; Wang Y; Addya S; Pucha RV; Choudhury A; Sundaram V; Tummala R (2011). *Co-W as an advanced barrier for intermetallics and electromigration in fine-pitch flipchip interconnections*. Proceedings - Electronic Components and Technology Conference (pp. 916 - 920)
- 18) Sukumaran V; Bandyopadhyay T; Chen Q; Kumbhat N; Liu F; Pucha R; Sato Y; Watanabe M; Kitaoka K; Ono M (2011). *Design, fabrication and characterization of low-cost glass interposers with fine-pitch through-package-vias*. Proceedings - Electronic Components and Technology Conference (pp. 583 - 588)
- 19) Chen Q; Bandyopadhyay T; Suzuki Y; Liu F; Sundaram V; Pucha R; Swaminathan M; Tummala R (2011). *Design and demonstration of low cost, panel-based polycrystalline silicon interposer with through-package-vias (TPVs)*. Proceedings - Electronic Components and Technology Conference (pp. 855 - 860)
- 20) Bhuiyan MA; Pucha RV; Karevan M; Kalaitzidou K (2011). *Modeling the effect of filler-matrix contact and fillers' agglomeration on effective modulus of polymer nanocomposites*. Annual Technical Conference - ANTEC, Conference Proceedings (pp. 661 - 664)
- 21) Krishnan G; Fuhun L; Sundaram V; Pucha R; Kennedy S; Baars D; Dobrick J; Guo D; Neill J; Paul S (2008). *High performance organic dielectrics and high density substrates for next generation system on a package (SOP) technology*. Proceedings - Electronic Components and Technology Conference (pp. 2101 - 2104)
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- 35) Kumbhat N; Raj PM; Pucha RV; Sundaram V; Doraiswami R; Bhattacharya S; Hayes S; Atmur S; Sitaraman SK; Tummala RR (2004). *Next generation of package/board materials technology for ultra-high density wiring and fine-pitch reliable interconnection assembly*. Proceedings - Electronic Components and Technology Conference (pp. 1843 - 1850)
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- 38) Ramakrishna G; Pucha RV; Sitaraman SK (2002). *Micro-scale plasticity effects in microvia reliability analysis*. Proceedings - Electronic Components and Technology Conference (pp. 1304 - 1309)
- 39) Hegde S; Pucha RV; Takahashi A; Takano N; Sitaraman SK (2002). *Thermomechanical reliability of high density wiring substrates*. Thermomechanical Phenomena in Electronic Systems -Proceedings of the Intersociety Conference (pp. 919 - 925)
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- 41) Hedge S; Pucha RV; Takahashi A; Takano N; Sitaraman SK (2002). *Thermomechanical reliability of high density wiring substrates*. InterSociety Conference on Thermal and Thermomechanical Phenomena in Electronic Systems, I THERM (pp. 919 - 925)
- 42) Tunga K; Pyland J; Pucha RV; Sitaraman SK (2002). *Study on the choice of constitutive and fatigue models in solder joint life prediction*. ASME International Mechanical Engineering Congress and Exposition, Proceedings (pp. 329 - 335)
- 43) Hegde S; Pucha RV; Sitaraman SK (2002). *Enhanced reliability of high density wiring (HDW) substrates through new dielectric and base substrate materials*. American Society of Mechanical Engineers, Electronic and Photonic Packaging, EPP (pp. 283 - 290)
- 44) Hegde S; Pucha RV; Sitaraman SK (2002). *Enhanced reliability of High Density Wiring (HDW) substrates through new dielectric and base substrate materials*. ASME International Mechanical Engineering Congress and Exposition, Proceedings (pp. 283 - 290)
- 45) Tunga K; Pyland J; Pucha RV; Sitaraman SK (2002). *Study on the choice of constitutive and fatigue models in solder joint life prediction*. American Society of Mechanical Engineers, Electronic and Photonic Packaging, EPP (pp. 329 - 335)
- 46) Pyland J; Pucha R; Sitaraman S (2001). *Effect of underfill on BGA reliability*. Proceedings - Electronic Components and Technology Conference (pp. 85 - 90)
- 47) Pucha RV; Ramakrishna G; Sitaraman SK (2001). *Mechanics issues at micro-scale modeling of electronic packages*. ASME International Mechanical Engineering Congress and Exposition, Proceedings (pp. 2135 - 2144)
- 48) Pyland J; Pucha R; Sitaraman S (2000). *Does underfilling enhance BGA reliability?*. Proceedings of the Electronic Packaging Technology Conference, EPTC (pp. 241 - 245)
- 49) Pucha RV; Utschig TT (2009). *Computer-Aided-Nano-Design Education in the Engineering Curriculum: Scope and Challenges*. Proceedings of the ASEE Southeast

Section Conference.

<http://se.asee.org/proceedings/ASEE2009/papers/PR2009066PUC.PDF>

## B. Other Publications and Creative Products

### *Provisional Patents*

1. US 61/378,625, “Stress-Decoupling Through Via-Structures, Materials and Methods”, Raj, P.M., Kumbhat, N. Pucha, R.V., Sundaram, V., and Tummala, R.R., 2010
2. US60/587,945, “Trench-Via Shape Design for Improved Mechanical and Electrical Reliability of On-Chip Interconnect with Cu/Low-K,” Zheng, J., Sitaraman, S.K., and Pucha, R.V., 2004.
3. US60/591,508, “Cu/low-K Interface Adhesion Enhancement Through Nano-Colonies of Adhesive Materials,” Zheng, J., Sitaraman, S.K., and Pucha, R.V., 2004.

## C. Presentations

1. Pucha, R.V (2020). A Socio-Technical Project-based Teaching /Learning with SDG Framework. Invited Talk, *Think Globally, Teach Locally; CTL Workshop*, Feb.19, Student Center Piedmont Room, Georgia Tech.
2. Pucha, R., Newton, S., and Alemdar, M. (2019). “Freshman Engineering Students See Value in Sustainability-themed Project-based Learning”. Presented at *Sustainability Showcase: Kendeda Building for Innovative Sustainable Design*. Oct.28 – 30, Georgia Tech., Atlanta, GA, USA.
3. Pucha, R.V (2016). Creative and Critical Thinking Skills for Engaged Learning in Cornerstone Design Course. Poster Presentation, *Celebrating Teaching Day*, Student Center Ball room, Georgia Tech.
4. Pucha, R.V (2014). Integrated Design-Analysis tools for Manufacturing of Nanocomposites with Engineered Properties. Invited Talk, *Mechanical Engineering Seminar Series*, Auburn University.
5. Zweben, C., Hu, H., Pucha, R.V., Sitaraman, S.K., Tummala, R., Qu, J. and White, G. (2001). Development of the next generation of base substrates: concepts and analytical methods. *The International Symposium & Exhibition on Advanced Packaging Materials*, Braselton, Georgia, USA.
6. Espinosa, H.D., Pucha, R.V., and Patanella, A. (1999). Dynamic compression-shear testing of brittle materials with specimen recovery. *The 15<sup>th</sup> US Army Symposium on Solid Mechanics*, Myrtle Beach, South Carolina, USA.
7. Pucha, R.V., Dwivedi, S., Zavattieri, P.D. and Espinosa, H.D. (1998). Modeling size effects in brittle materials undergoing damage and fragmentation. *The 13<sup>th</sup> U.S. National Congress of Applied Mechanics*, University of Florida, USA, June 1998.
8. Patanella, A.J., Arrieta, H.V., Fischer, M., Xu, Y., Pucha, R.V., and Espinosa, H.D. (1998). Pressure – shear recovery experiments in brittle materials. *ICEM – 98*, Oxford, UK, 24-28, August 1998.

- Pucha, R.V., Govindarajan, R., Kanmani, T. and Krishna Murty, A.V. (1990). Estimation of interlaminar stresses through finite elements. The 42<sup>nd</sup> Annual general body meeting, Aeronautical Society of India. Calcutta, India.

#### D. Grants and Contracts

##### As Co-Principal Investigator

Title: SUSTAINABLE MANUFACTURING VIA MULTI-SCALE PHYSICS-BASED PROCESS MODELING...

Agency: THIRD WAVE SYSTEMS/MINNEAPOLIS, MN

Amount: 809,968.00

Role: co-PI

Collaborators: Shreyes Melkote (PI), Roshan Vengazhiyil (co-PI), John Morehouse (co-PI), Raghuram Pucha (co-PI)

Period of Contract: 09/01/2012 - 12/30/2015

Candidate's Share: One month of summer salary

Title: Multidisciplinary Materials Information Network Seed Grant

Agency: Institute of Materials, Georgia Tech

Amount: 15,000.00

Role: co-PI

Collaborators: Dr. Kyriaki Kalaitzidou (PI) and Dr. Surya Kalidindi (Co-PI)

Raghuram Pucha (co-PI)

Period of Contract: September 1, 2014 - June 30, 2015

Candidate's Share: Salary of undergrad researcher for two semesters

##### As Senior Personnel or Contributor

Title: REVAMP (Research Experience for Student Veterans in Advanced Manufacturing and Entrepreneurship)

Agency: NSF Research Experience for Undergraduates (REU) grant

Amount: 360,000.00

Role: Contributor

Collaborators: Chun (Chuck) Zhang (PI), John Morehouse (Co-PI)

Period of Contract: Summer 2014 – Summer 2017

Candidate's Share: Salary of undergrad researcher for summer

Title: ADVANCED PACKAGING PROGRAM

Agency: DUPONT TECHNOLOGIES/RESEARCH TRIANGLE PARK, NC

Amount: 568,000.00

Role: Contributor

Collaborators: Rao Tummala (PI)

Period of Contract: 09/01/2004 - 04/30/2008

Candidate's Share: Part of Salary as Research Engineer

Title: CERAMIC MATRIX COMPOSITE BOARDS FOR SOP AND SIP ELECTRONIC PACKAGING

Agency: STARFIRE SYSTEMS/WATERVLIET, NY

Amount: 800,264.00

Role: Contributor

Collaborators: Rao Tummala (PI)

Period of Contract: 11/01/2002 - 11/24/2005



Candidate's Share: Part of salary as Postdoctoral Researcher

**Proposals Submitted But Not Funded**

Title: COLLABORATIVE RESEARCH: POLYMER NANOCOMPOSITES WITH ENGINEERED TENSILE PROPERTIES

Sponsoring Agency: NATIONAL SCIENCE FOUNDATION (NSF)/GENERAL

Amount Requested: 226,059

PI: KALAITZIDOU, KYRIAKI

Co-PI: PUCHA, RAGHURAM

Status: Decline

Submitted Date: 09/17/2014

**VI. Service**

**A. Professional Contributions**

*Member:* ASME, American Society of Mechanical Engineers  
1997 to present

*Member:* ASEE, American Society for Engineering Education  
2005 to present

*Senior Member:* IEEE, Institute of Electrical and Electronics Engineers

*Senior Member (Life)*

AIAA, American Institute of Aeronautics and Astronautics

*Chair, Pre-College Outreach / STEM K-12, AIAA Atlanta Chapter Fall 2012 – 2017*

*Associate Editor:* Engineering Design Graphics Journal, 2014 - 2018

*Technical Reviewer:* Engineering Design Graphics Journal, Design of Materials, Composite Structures, IEEE Transactions on Advanced Packaging, IEEE Transactions on Components and Packaging Technologies, ASME Journal of Electronic Packaging, ESIME 2003: European Conference on Microelectronics Reliability

**B. Public and Community Service**

Judge: Intel International Science and Engineering Fair, Arizona, 2016 and 2019

Judge: Georgia Science and Engineering Fair, Athens GA. 2012 – Present

Selection Judge (Eng. Design division): Georgia Governor's Honors Program 2015 – present

**C. Institute Contributions**

*Service on Thesis or Dissertation Committees*

Sungkun Hwang: PhD, School of Mechanical Engineering, Georgia Tech (Spring 2021)

Yi Zhou: MS, School of Mechanical Engineering, Georgia Tech (Fall 2019)

Kaya Demir: PhD, School of Electrical & Computer Engineering, Georgia Tech (Fall 2016)

Faisal Siddiqui: PhD, School of Aerospace Engineering, Georgia Tech (Summer 2015)

Atiq Bhuiyan: PhD, School of Mechanical Engineering, Georgia Tech (Summer 2013)

Ganesh Krishnan: MS, School of Materials Science, Georgia Tech (Fall 2008)

Injoong Kim: PhD Student, School of Mechanical Engineering, Georgia Tech (Fall 2007)

*Service on other Committees*

G. W.W. School Instructional Labs Committee, Fall 2014- present

Mentor, CETL Teaching Fellows program, Fall 2015

Judge, Georgia Tech Undergraduate Research Symposium 2012, 2013

Judge, Georgia Tech InventurePrize 2013

## **VII. Professional Growth and Development**

1. CTL Teaching Scholar 2020: Faculty Learning Community (FLC): Transparency in Learning and Teaching (TiLT).
2. CTL Teaching Scholar, 2018 – 2019, Georgia Tech. – Teaching as Research program.
3. Inaugural Serve-Learn-Sustain: [Food, Energy, and Water Systems \(FEWS\) Fellow in 2016 to implement sustainability aspects in the curriculum](#)
4. CTL Teaching Scholar 2015-2016, Georgia Tech. – to explore research and best practices related to the notion of developing critical thinkers in classroom.
5. GWW Woodruff School of Mechanical Engineering Teaching Fellow Spring 2014
6. CETL Inaugural 1969 Teaching Scholar, 2008 – 2009, Georgia Tech. – to develop peer-assisted learning initiative in classroom.