Michael Cullinan

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Austin, TX 78712
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EDUCATION

Massachusetts Institute of Technology — Cambridge, MA
Ph.D., Mechanical Engineering — Feb. 2008 – Feb. 2011
Thesis: Design and Fabrication of Precision Carbon Nanotube-based Flexural Transducers

Massachusetts Institute of Technology — Cambridge, MA
S.M., Mechanical Engineering — July 2006 – Jan. 2008
Thesis: Control of Carbon Nanotube Stiffness via Tunable Fabrication Process Parameters that Determine CNT Geometry

Swarthmore College — Swarthmore, PA
B.S., Engineering, High Honors; B.A., Economics — Sept. 2002 – June 2006
Thesis: Design of a Crossflow Turbine for a Hydroelectric Roller-Compacted Concrete Gravity Dam

Academic Employment

University of Texas at Austin — Austin, TX
Assistant Professor, Department of Mechanical Engineering — Aug. 2013 - Present
Director of Nanoscale Design and Manufacturing Laboratory

National Institute of Standards and Technology — Gaithersburg, MD
National Research Council Postdoctoral Associate, Engineering Laboratory, Intelligent Systems Division, Production Systems Group — Jan. 2012 – Aug. 2013

Massachusetts Institute of Technology — Cambridge, MA
Research Assistant, Department of Mechanical Engineering — July 2006 – May 2011

Massachusetts Institute of Technology — Cambridge, MA
Teaching Assistant, 2.72 Elements of Mechanical Design — Jan. 2010 – May 2010

National Nanotechnology Infrastructure Network — Santa Barbara, CA
NSF Research Experiences for Undergraduates at the University of California at Santa Barbara — June 2005 – Aug. 2005

University of Minnesota, Department of Mechanical Engineering — Minneapolis, MN
NSF Research Experiences for Undergraduates — June – Aug. 2004

HONORS AND AWARDS

Outstanding Young Manufacturing Engineer Award, Society of Manufacturing Engineers — 2016
Top Ranked Proposal in August 2011 NIST-NRC Postdoctoral Fellowship Review — 2011
2nd Prize, de Florez Award Competition, Graduate Science Division — 2010
Best Student Poster, MIT Manufacturing Summit — 2007

MIT Neil Pappalardo Fellowship	2006
Tau Beta Pi, National Engineering Honor Society	2006
Sigma Xi, The Scientific Research Society	2006

RESEARCH GRANTS RECIVED

1. **Cullinan, M.** (PI) "Large-Area Probe-based Metrology Systems of Nanomanufacturing Applications," NASCENT Center, UT-Austin, $87,619, Sep. 2015 – Aug. 2016.
2. **Cullinan, M.** (PI), Crawford, R. (Co-PI), Rylander, N. (Co-PI) "Development of Finite Element Modules for the Mechanical Engineering Undergraduate Curriculum," Academic Development Funds, University of Texas at Austin, $47,199, September 1, 2015 – August 31, 2016.
3. **Cullinan, M.** (PI) "Selective Micro Laser Sintering for Packaging Applications," Freescale Semiconductor Inc., $289,581, January 23, 2015 - January 15, 2018.
4. **Cullinan, M.** (PI) "Large-Area Probe-based Metrology Systems of Nanomanufacturing Applications," NASCENT Center, UT-Austin, $81,346, Sep. 2014 – Aug. 2015.
5. **Cullinan, M.** (PI) "Development of Novel Nanomanufacturing Processes and Equipment," Summer Research Assignment, University of Texas at Austin, $19,862, Summer 2014.
6. **Cullinan, M.** (PI) "Wafer-Scale Nanomanufacturing of Graphene-Based Electromechanical Devices" Engineering Laboratory Exploratory Research Project, National Institute of Standards and Technology, $140,000, Oct. 2012-Sep. 2013.

BOOK CHAPTERS

1. **Cullinan, M.** "Nanoscale Sensors and Actuators for MEMS and NEMS." Dekker Encyclopedia of Nanoscience and Nanotechnology, Third Edition, Taylor & Francis, 2013.

PUBLICATIONS IN REFEREED JOURNALS

13. Kline, G., Nagle, M., Davis, A., Wurz, J., and **Cullinan, M.** "Analysis and Modelling of Stiction Effects from Van der Waals Forces in Solid and Liquid Lubricated Surfaces." *Journal of Tribology, (Submitted).*

12. **Cullinan, M.** and Culpepper, M. "Noise Mitigation Techniques for Carbon Nanotube-Based Piezoresistive Sensor Systems." *Journal of Micro and Nano-Manufacturing, Vol. 1, 2013, pp. 011011.*

11. **Cullinan, M.** and Culpepper, M. "Effects of Chirality and Impurities on the Performance of Carbon Nanotube-Based Piezoresistive Sensors." *Carbon*, Vol. 51, 2013, pp. 59.

10. **Cullinan, M.**, Panas, R., and Culpepper, M. "A Multi-Axis MEMS Sensor with Integrated Carbon Nanotube-Based Piezoresistors for Nanonewton Level Force Metrology." *Nanotechnology*, Vol. 23, 2012, pp. 325501.

9. **Cullinan, M.**, Panas, R., DiBiasio, C., and Culpepper, M. "Scaling Electromechanical Sensors Down to the Nanoscale." *Sensors and Actuators A*, Vol. 187, 2012, pp. 162.

8. Panas, R., **Cullinan, M.**, and Culpepper, M. "Design of Piezoresistive-based MEMS Sensor Systems for Precision Microsystems." *Precision Engineering*, Vol. 36, 2012, pp, 44.

7. Eusner, T., **Cullinan, M.**, Ruggiero, C., Zarrouati, N., and Chepko, A. "Measurement of Human Response to Tactile Temperature Sensing Using Stochastic System Identification." *Measurement*, Vol. 44, 2011, pp. 965.

6. **Cullinan, M.** and Culpepper, M. "Carbon Nanotubes as Piezoresistive Microelectromechanical Sensors: Theory and Experiment." *Physical Review B*, Vol. 82, 2010, pp. 115428.

5. Howell, L.L., DiBiasio, C.M., **Cullinan, M.A**., Panas, R., Culpepper, M.L. "A Pseudo-Rigid-Body Model for Large Deflections of Fixed-Guided Carbon Nanotubes." *Journal of Mechanisms and Robotics*, Vol. 2, 2010, pp. 034501.

4. **Cullinan, M.** and Culpepper, M. "Control of Carbon Nanotube Geometry via Tunable Process Parameters." *Applied Physics Letters*, Vol. 93, 2008, pp. 103106.

3. DiBiasio, C., **Cullinan, M.**, and Culpepper, M. "Difference Between Bending and Stretching Moduli of Single-Walled Carbon Nanotubes that are Modeled as an Elastic Tube*." Applied Physics Letters*, Vol. 90, 2007, pp. 203116.

2. Hafiz, J., Mukherjee, R., Wang, X, **Cullinan, M.**, Heberlein, J., McMurry, P., and Girshick, S. "Nanoparticle-Coated Silicon Nanowires." *Journal of Nanoparticle Research*, Vol. 8, 2006, pp. 995.

1. Hafiz, J., Mukherjee, R., Wang, X., Marshall, M., Twesten, N., **Cullinan, M.**, Heberlein, J., McMurry, P., and Girshick, S. "Effect of process Parameters on the Structure of Si-Ti-N Nanostructured Coatings Deposited by Hypersonic Plasma Particle Deposition." *Surface and Coatings Technology*, Vol. 200, 2005, pp. 1524.

CONFERENCE PUBLICATIONS

26. Yao, T-F. and **Cullinan, M.** "In-line, Wafer-Scale Inspection in Nano-Fabrication Systems." Proceedings of the American Society for Precision Engineering, Austin, TX, November 5, 2015.

25. Duenner, A. and **Cullinan, M.** "Passive Semiconductor Wafer Alignment Mechanism to Support In-line Atomic Force Microscope Metrology." Proceedings of the American Society for Precision Engineering, Austin, TX, November 5, 2015.

24. Sun, G. and **Cullinan, M.** "Design of a MEMS-Based Tunable Graphene Resonator System with Precision Strain and Force Metrology." Proceedings of the American Society for Precision Engineering, Austin, TX, November 5, 2015.

23. Ladner, I. and **Cullinan, M.** "Carbon Nanotube Growth Force Detection on Multi-Axis MEMS Sensor with Integrated Microheater." Proceedings of the American Society for Precision Engineering, Austin, TX, November 5, 2015.

22. Ladner, I. and **Cullinan, M.** "Design of a Multi-Axis MEMS Force Sensor for Evaluating the Effectiveness of Drug Coatings for Implantable Devices." Workshop on Enabling Nanofabrication for Rapid Innovation, Napa, CA, August 22, 2015.

21. Roy, N., Yuksel, A., and **Cullinan, M.** "μ-SLS of Metals: Physical and Thermal Characterization of Cu Nanopowders." International Freeform Fabrication Symposium, Austin, Texas, August 12th, 2015.

20. Roy, N. and **Cullinan, M.** "Design of the Powder Spreading System and the Powder Bed Actuation." International Freeform Fabrication Symposium, Austin, Texas, August 11th, 2015.

19. Ladner, I. and **Cullinan, M.** "Localized Growth and Force Detection of Carbon Nanotubes on Multi-axis MEMs Sensor." Proceedings of the American Society for Precision Engineering, Boston, MA, November 11, 2014.

18. **Cullinan, M.**, Cheng, G., Sperling, B., Hight Walker, A., Davydov, A., and Gorman, J., "Transfer-Free Wafer-Scale Growth of Graphene on Thin-Film Copper." The 58th International Conference on Electron, Ion, and Photon Beam Technology and Nanofabrication, Washington, D.C., May 28th, 2014.

17. **Cullinan, M.** and Gorman, J., "Transfer-Free, Wafer-Scale Fabrication of Suspended Graphene Nanoelectromechanical Structures." Workshop on Enabling Nanofabrication for Rapid Innovation, Napa, CA, August 20, 2013.

16. **Cullinan, M.** and Gorman, J., "Transfer-Free, Wafer-Scale Fabrication of Graphene-Based Nanoelectromechanical Resonators." Microsystems for Measurement and Instrumentation, Gaithersburg, MD, May 14, 2013.

15. Panas R. M., **Cullinan, M.A.**, and Culpepper, M.L. "Non-Lithographically-Based Microfabrication of Precision MEMS Nanopositioning Systems." *Proceedings of the 2011 Annual Meeting of the American Society for Precision Engineering*. Denver, CO, November 13-18, 2011.

14. **Cullinan, M.**, Panas, R., Daniel, C., Gafford, J., and Culpepper, M. "Non-Cleanroom Fabrication of Carbon Nanotube-Based MEMS Force and Displacement Sensors." Accepted in the *Proceedings of the ASME 2011 International Design Engineering Technical Conferences*. Washington D.C., August 29-31, 2011.

13. **Cullinan, M.** and Culpepper, M. "Design and Fabrication of Single Chirality Carbon Nanotube-Based Sensors." Accepted in the *Proceedings of the 11th International Conference on Nanotechnology* (IEEE NANO 2011). Portland, OR, August 15-18, 2011.

12. **Cullinan, M.**, Panas, R., and Culpepper, M. "Design and Fabrication of a Multi-Axis MEMS Force Sensor with Integrated Carbon Nanotube Based Piezoresistors." *Proceedings of the Nanotech 2011 Conference and Expo*. Boston, MA, June 13-16, 2011.

11. **Cullinan, M.**, Panas, R., and Culpepper, M. "A Multi-Axis MEMS Sensor with Integrated Carbon Nanotube-Based Piezoresistors for Precision Force Metrology." *Proceedings of the 11th International Conference of the European Society for Precision Engineering and Nanotechnology*. Lake Como, Italy, May 23-27, 2011.

10. **Cullinan, M.** and Culpepper, M. "Noise Mitigation Techniques for Carbon Nanotube-based Piezoresistive Sensor Systems." *Proceedings of the 2010 Fall Meeting of the Materials Research Society.* Boston, MA, November 29 – December 3, 2010.

9. Gafford, J., Panas, R., **Cullinan, M.** and Culpepper, M. "Design Principles and Best Practices for Rapid Prototyping of Meso- and Micro-scale Flexures via Micromilling." *Proceedings of the*

2010 Annual Meeting of the American Society for Precision Engineering. Atlanta, GA, October 31 – November 5, 2010.

8. **Cullinan, M.**, Panas, R., Daniel, C., and Culpepper, M. "Carbon Nanotube-Based Sensors for Small-scale Force and Displacement Sensors." *Proceedings of the 2010 Annual Meeting of American Society for Precision Engineering*. Atlanta, GA, October 31 – November 5, 2010.

7. Panas R. M., **Cullinan, M.A.**, and Culpepper, M.L. "A Systems Approach to Modeling of Piezoresistive MEMS Sensors." *Proceedings of the 2010 American Society for Precision Engineering Control of Precision Systems Conference*. Boston, MA, April 10-13, 2010.

6. **Cullinan, M.**, Panas, R, and Culpepper, M. "Design of Micro-Scale Multi-Axis Force Sensors for Precision Applications." *Proceedings of the 2009 Annual Meeting of the American Society for Precision Engineering*. Monterey, CA, October 4-9 2009.

5. **Cullinan, M.** and Culpepper, M. "Controlling the Stiffness of Carbon Nanotube Based Compliant Mechanisms." *Proceedings of the 5th International Symposium on Nanomanufacturing*. Singapore, January 23-25, 2008, pp. 47.

4. **Cullinan, M.**, DiBiasio, C., Howell, L, Culpepper, M., and Panas, R. "Modeling of a Clamped-Clamped Carbon Nanotube Flexural Element for use in Nanoelectromechanical Systems." *The 13th National Conference on Mechanisms and Machines*, Bangalore, India, December 12, 2007.

3. Culpepper, M., DiBiasio, C., Panas, R., and **Cullinan, M.** "Modeling and Design of Carbon Nanotube-based Flexures and Compliant Mechanisms for Nanomechanical Devices." *Proceedings of the 4th International Symposium on Nanomanufacturing,* Cambridge, MA, November 1-4, 2006, pp. 253.

2. Hafiz, J., Mukherjee, R., Wang, X., Marshall, M., Twesten, N., **Cullinan, M.**, Heberlein, J., McMurry, P., and Girshick, S. "Effect of Process Parameters on the Structure of Si-Ti-N Nanostructured Coatings Deposited by Hypersonic Plasma Particle Deposition." *Proceedings of the International Conference on Metallurgical Coatings and Thin Films*. San Diego, CA, February 5, 2005.

1. **Cullinan, M.**, Ward, M., and MacDonald, N. "Porous Nanostructured Titania." *NNIN REU Research Accomplishments*, Vol. 8, August 11, 2005, pp. 24.

PRESENTATIONS

Oral Presentations

20. **Cullinan, M.** "Opportunities and Changes in Micro and Nanomanufacturing," 3M Lunch and Learning Lecture Series, Austin, TX, September 18, 2015.

19. **Cullinan, M.** "Nanomanufacturing of Carbon-based Materials for Nanoelectromechanical Sensor Systems," Center for Nano- and Molecular Science, University of Texas, Austin, TX, November 19, 2014.

18. **Cullinan, M.** "Nanomanufacturing of Carbon-based Materials for Nanoelectromechanical Sensor Systems" Department of Mechanical Engineering, University of Illinois, Urbana, IL, April, 2013.

17. **Cullinan, M.** "Nanomanufacturing of Carbon-based Materials for Nanoelectromechanical Sensor Systems" Department of Mechanical Engineering, University of Texas, Austin, TX, March 25, 2013.

16. **Cullinan, M.** and Gorman, J., "Transfer-Free, Wafer-Scale Manufacturing of Graphene-Based Electromechanical Resonant Devices." March Meeting of the American Physical Society, Baltimore, MD, March 20, 2013.

15. **Cullinan, M.** "Nanomanufacturing of Carbon-based Materials for Nanoelectromechanical Sensor Systems" Department of Mechanical Engineering, University of California, Berkeley, CA, March 12, 2013.

14. **Cullinan, M.**, "Carbon Nanotube-Based Piezoresistive Sensors for Precision Force and Displacement Measurements." Intelligent Systems Division Seminar, National Institute of Standards and Technology, Gaithersburg, MD, March 12, 2012.

13. **Cullinan, M.**, Panas, R., Daniel, C., Gafford, J., and Culpepper, M. "Non-Cleanroom Fabrication of Carbon Nanotube-Based MEMS Force and Displacement Sensors." ASME 2011 International Design Engineering Technical Conferences. Washington D.C., August 29, 2011.

12. **Cullinan, M.** and Culpepper, M. "Design and Fabrication of Single Chirality Carbon Nanotube-Based Sensors." 11th International Conference on Nanotechnology (IEEE NANO 2011). Portland, OR, August 16, 2011

11. **Cullinan, M.** and Culpepper, M. "'Effects of Chirality and Impurities on the Performance of Carbon Nanotube-Based Piezoresistive Sensors" International Conference on the Science and Application of Nanotubes 2011. Cambridge, England, July 12, 2011.

10. **Cullinan, M.** "Design and Fabrication of a Multi-Axis MEMS Force Sensor with Integrated Carbon Nanotube Based Piezoresistors." Nanotech 2011 Conference and Expo. Boston, MA, June 15, 2011.

9. **Cullinan, M.** "A Multi-Axis MEMS Sensor with Integrated Carbon Nanotube-Based Piezoresistors for Precision Force Metrology." 11th International Conference of the European Society for Precision Engineering and Nanotechnology. Lake Como, Italy, May 24, 2011.

8. **Cullinan, M.** "Carbon Nanotube-Based Piezoresistive Sensors for Precision Force and Displacement Measurements." Department of Mechanical and Industrial Engineering Seminar Series, University of Massachusetts, Amherst, Amherst, MA, February 28, 2011.

7. **Cullinan, M.** "Design and Fabrication of Carbon Nanotube-Based Piezoresistive Sensors for Precision Force Measurements" Department of Mechanical Engineering and Mechanics, Drexel University, Philadelphia, PA, February 23, 2011.

6. **Cullinan, M.** "Precision Force and Displacement Metrology Using Carbon Nanotube-Based Piezoresistive Sensors" Department of Mechanical Engineering, University of Utah, Salt Lake City, UT, February 11, 2011.

5. **Cullinan, M.** "Design of High-Precision Carbon Nanotube-Based Flexural Transducers." Presentation, Laboratory for Manufacturing and Productivity Student Seminar Series, Cambridge, MA, February 16, 2010.

4. **Cullinan, M.** "Challenges in Incorporating Carbon Nanotubes into MEMS and NEMS Devices." Presentation, MIT Micro/Nano Seminar Series, Cambridge, MA, November 4, 2009.

3. **Cullinan, M.** "Controlling the Stiffness of Carbon Nanotube-Based Compliant Mechanisms." Presentation, Laboratory for Manufacturing and Productivity Student Seminar Series, Cambridge, MA, August 12, 2008.

2. **Cullinan, M.** "Controlling the Stiffness of Carbon Nanotube-Based Compliant Mechanisms." Presentation, 5th International Symposium on Nanomanufacturing, Singapore, January 25, 2008.

1. **Cullinan, M.** "Porous Nanostructured Titania." Presentation, 2005 NNIN REU Convocation, Stanford University, August 11, 2005.

Poster Presentations

25. Ladner, I. and **Cullinan, M.** " Design of a Multi-Axis MEMS Force Sensor for Evaluating the Effectiveness of Drug Coatings for Implantable Devices." Workshop on Enabling Nanofabrication for Rapid Innovation, Napa, CA, August 22, 2015.

24. Ladner, I., Sun, J., and **Cullinan, M.** "Design and Fabrication of a MEMS Transducer for In-Situ Force Spectroscopy of CVD Growth Processes." Transducers 2015, Anchorage, AK, June 22, 2015.

23. Ladner, I. and **Cullinan, M.**, "Direct Printing of Carbon Nanotubes: Tool Design and Fabrication." Solid-State Sensors, Actuators, and Microsystems Workshop, Hilton Head, SC, June 8, 2014.

22. **Cullinan, M.** and Gorman, J., "Transfer-Free, Wafer-Scale Fabrication of Suspended Graphene Nanoelectromechanical Structures." Workshop on Enabling Nanofabrication for Rapid Innovation, Napa, CA, August 20, 2013

21. **Cullinan, M.** and Gorman, J., "Transfer-Free, Wafer-Scale Manufacturing of Graphene-Based Nanoelectromechanical Resonant Devices." Workshop on Nano and Micro Manufacturing, Dearborn, MI, May 22, 2013.

20. **Cullinan, M.** and Gorman, J., "Transfer-Free, Wafer-Scale Fabrication of Graphene-Based Nanoelectromechanical Resonators." Microsystems for Measurement and Instrumentation, Gaithersburg, MD, May 14, 2013.

19. **Cullinan, M.** and Gorman, J. "Transfer-Free, Wafer-scale Manufacturing of Graphene-Based Nanoelectromechanical Resonant Devices." NIST Sigma Xi 20th Annual Postdoctoral Poster Presentation, Gaithersburg, MD, February, 27, 2013.

18. **Cullinan, M.** and Culpepper, M. "Carbon Nanaotube-Based Piezoresistive Transducers for MEMS Sensing Applications." Solid-State Sensors, Actuators, and Microsystems Workshop Hilton Head, SC, June 6, 2012.

17. **Cullinan, M.** and Culpepper, M. "Noise Mitigation Techniques for Carbon Nanotube-Based Piezoresistive Sensor Systems." 2010 Fall Meeting of the Materials Research Society, Boston, MA, December 1, 2010.

16. Gafford, J., Panas, R., **Cullinan, M.**, and Culpepper, M. "Design principles and Best Practices for Rapid Prototyping of Meso- and Micro-scale Flexures via Micromilling." 2010 Annual Meeting of the American Society for Precision Engineering, Atlanta, GA, November 2, 2010.

15. **Cullinan, M.**, Panas, R., Garcia, L., and Culpepper, M. "Carbon Nanotube-Based Sensors for Small-scale Force and Displacement Sensors." 2010 Annual Meeting of American Society for Precision Engineering, Atlanta, GA, November 2, 2010.

14. **Cullinan, M.** and Culpepper, M. "Carbon Nanotube-Based Piezoresistive MEMS Sensors." De Florez Award Competition, Cambridge, MA, May 5, 2010. (2nd Place)

13. **Cullinan, M.**, Panas, R., and Culpepper, M. "CNT-Based Piezoresistive MEMS Sensors." MIT Manufacturing Summit, Cambridge, MA, April 22, 2010.

12. Panas, R., **Cullinan, M.**, and Culpepper, M. "Design of Multi-Axis MEMS Force Sensors." MIT Manufacturing Summit, Cambridge, MA, April 22, 2010.

11. **Cullinan, M.**, Panas, R, and Culpepper, M. "Design of Micro-Scale Multi-Axis Force Sensors for Precision Applications." 2009 Annual Meeting of the American Society for Precision Engineering, Monterey, CA, October 4, 2009.

10. **Cullinan, M.**, Panas, R., and Culpepper, M. "CNT Printing with Force Feedback." MIT Manufacturing Summit, Cambridge, MA, April 23, 2009.

9. **Cullinan, M.** and Culpepper, M. "Controlling the Stiffness of Carbon Nanotube-Based Compliant Mechanisms." MIT Manufacturing Summit, Cambridge, MA, September 28, 2007.

8. **Cullinan, M.**, DiBiasio, C., Panas, R. and Culpepper, M. "Modeling and Design of Carbon Nanotube-Based Compliant Mechanisms." MIT Manufacturing Summit, Cambridge, MA, September 28, 2007. (First Prize)

7. **Cullinan, M.** and Culpepper, M. "Controlling the Stiffness of Carbon Nanotube-Based Compliant Mechanisms." MIT Precision Engineering Center Open House, Cambridge, MA, August 15, 2007.

6. **Cullinan, M.,** Ward, M., and MacDonald, N. "Porous Nanostructured Titania." 2005 Swarthmore Summer Research Convocation, Swarthmore, PA, October 10, 2005.

5. **Cullinan, M.**, Ward, M., and MacDonald, N. "Porous Nanostructured Titania." 2005 NNIN REU Convocation, Stanford University, August 12, 2005.

4. **Cullinan, M.**, Ward, M., and MacDonald, N. "Porous Nanostructured Titania." 2005 University of California - Santa Barbara Summer Research Convocation, Santa Barbara, CA, August 3, 2005.

3. **Cullinan, M.**, Hafiz, J., Wang, X., Mukherjee, R., McMurry, P., Heberlein, J., and Girshick, S. "Analysis of Superhard Nanostructured Thin Films." Swarthmore Summer Research Convocation, Swarthmore, PA, November 8, 2005.

2. **Cullinan, M.**, Hafiz, J., Wang, X., Mukherjee, R., McMurry, P., Heberlein, J., and Girshick, S. "Analysis of Superhard Nanostructured Thin Films." University of Minnesota Summer Research Convocation, Minneapolis, MN, August 10, 2004.

1. **Cullinan, M.**, Hafiz, J., Wang, X., Mukherjee, R., McMurry, P., Heberlein, J., and Girshick, S. "Analysis of Superhard Nanostructured Thin Films", University of Minnesota Department of Mechanical Engineering Summer Research Summit, Minneapolis, MN, August 10, 2004.

FEATURED ARTICLES

1. Nanotechweb.org "In Depth" featured article. "Controlling Carbon Nanotube Geometry via Tunable Process Parameters." October 13, 2008.

INVENTION DISCLOSURES

6. Yao, T-F., Duenner, A., and **Cullinan, M.** "A Method for Rapid Specimen-Setup in Wafer Inspection Systems" Patent Disclosure, October 24, 2015.
5. Yao, T-F, and **Cullinan, M.** "Simultaneously-and-Separately Driving of Multiple AFM Tips" Patent Disclosure, October 23, 2015.
4. Duenner, A. and **Cullinan, M.** "Method for Passive Alignment of Semiconductor Wafers" Patent Disclosure, October 23, 2015.
3. Yuksel, A. and **Cullinan, M.** "Powder-to-Parts Predictive Modeling of Microscale Selective Laser Sintering" Patent Disclosure, October 23, 2015.
2. Ladner, I. and **Cullinan, M.** "MEMS apparatus for multi-axis characterization, active force controlled growth, and assembly of nanostructures" Patent Disclosure, September 17, 2015.
1. Roy, N. and **Cullinan, M.** "Micro- Selective Laser Sintering System" Patent Disclosure, September 9, 2015.

TEACHING EXPERIENCE

ME338: Machine Elements — Fall 2013, Spring 2014, Fall 2014

- Core junior level course including the design and analysis of mechanical systems using both analytical methods and CAD modeling
- Developed a new project for the course that involves the design and fabrication of an RC car using the analysis tools developed in the course

ME397: Precision Machine Design — Spring 2015

- Graduate level course including the design and analysis of precision mechanical systems using both analytical methods and CAD modeling
- Develop tools for modeling error motions in mechanical systems
- Students design, build, and measure the error motions of a desktop lathe over the course of the semester

ME350: Machine Tool Operation for Engineers — Fall 2015

- Undergraduate level elective course including the principles of machine tool operation, the role of machine tools in manufacturing and manufacturing systems
- Develop hands on skills in using manual and CNC machine tools
- Students build several complex parts from raw materials in accordance with tight tolerance specifications

ME266K: Senior Design (Project Advisor) Fall 2013, Spring 2014, Fall 2014, Spring 2015 Fall 2015

- "Design of a Stapleless Paper Stapler", Phillip Le, Michael Lowder, Mr. Dan Nguyen; Fall 2013
- "NASA Telescope Focuser" Hanna Yancy, Eric Bishop, Jared Imm, Chelsea Kaplun; Spring 2014
- "NASA Enclosure", Karina Bonin, Richard North, James Kendrick, Vineet Raman; Spring 2014
- "Collector for Electrospinning of Nano Fibers", John Kramer, Li He, Luke Nicolini, Keh Farn Tan; Spring 2014
- "O-Ring Groove Designs for Face Seals" Federico Cueva, Daniel Carrizales, Arnold Hechanova, Javier Martinez; Spring 2014
- "Wheelchair Mount for iPhone or iPad" Colton Kolaja, Patrick Creamer, Trinidad Gaytan, Spencer Huble; Spring 2014
- "Design and CAD Validation of a Novel Shutter System for an Infrared Camera" Mason Davidson, Logan Herbort, Leland Konstanty, David Strickland; Spring 2014
- "Design of a Single Turn Multi-valve System" Cody Rigg, Kathyn Leahy, William Rogers, Nurbolat Yerlanov; Fall 2014
- "Static Friction in Telescopes" Austin Davis, Greg Kline, Mathew Nagle, Jillian Wurz; Fall 2014
- "Trunnion Ball Valve Bearing Redesign" Hannah Jones, Jonathan Parsons, Enakshi Wikramanayake, Nuryasmin Yusri; Spring 2015
- "Metal Seal Acceptance Criteria Basis and Testing" Rose Anthraper, Mudeer Habeeb, Harun Hersi, Seyedsiavash Zamani; Spring 2015
- "Design of an excel based design/calculation macro and prototype assemblies" Maimouna Diop, Maimouna Diop, Luis Alejandro Arias, Robert Noriega; Fall 2015

2.72: Elements of Mechanical Design at MIT (Teaching Assistant) Spring 2008, Spring 2010

- Responsibilities: Advising students on class project (design of a desktop lathe), helping students measure runout of lathe spindle and crossfeed, teaching lab component of class, designing and fabricating setup to measure runout of lathe spindle and crossfeed

GRADUATE RESEARCH STUDENTS SUPERVISED

Ian Ladner, "Design and Fabrication of a Tip-based Carbon Nanotube Printing System," Ph.D. Student; University of Texas at Austin; 2013-Present.

Tsung-Fu Yao, "Large-Area Probe-based Metrology Systems of Nanomanufacturing Applications," Ph.D. Student; University of Texas at Austin; 2014-Present.

Guoao Sun, "Design and Fabrications of Tunable Graphene Resonators," Ph.D. Student; University of Texas at Austin; 2014-Present.

Joon Hyong Cho, "Wafer-scale fabrication of Graphene-based Nanoelectromechanical Resonators," Ph.D. Student; University of Texas at Austin; 2014-Present.

Nilabh Roy, "Design of a Nanoscale Selective Laser Sintering System," Ph.D. Student; University of Texas at Austin; 2014-Present.

Anil Yuksel, "Modeling of the Microscale Selective Laser Sintering Process," Ph.D. Student; University of Texas at Austin; 2014-Present

Martin Ward, "Wafer Scale Exfoliation of Single Crystal Silicon Thin Films for Flexible Electronics," Ph.D. Student; University of Texas at Austin; 2015-Present

Ph.D. Committee Member

Daniel Moser	University of Texas at Austin	2017 (Expected)
Paras Ajay	University of Texas at Austin	2017 (Expected)
Praveen Joseph	University of Texas at Austin	2017 (Expected)
Hao Xin	University of Texas at Austin	2017 (Expected)
Alvin Lee	University of Texas at Austin	2016 (Expected)
Bradley Camburn	University of Texas at Austin	2015
Bailey Yin	University of Texas at Austin	2015

UNDERGRADUATE RESEARCH STUDENTS SUPERVISED

Andrew Duenner, "Design of a Passive Precision Wafer Alignment System," University of Texas at Austin; January 2015-Present

Jessica Sun, "Design and Fabrication of Polysilicon Piezoresistors," as part of NASCENT summer REU program; Summer 2014

Cody Daniel, "Fabrication of Non-photolithographic MEMS Devices," as part of the Undergraduate Research Opportunities Program at MIT; Summer 2010.

Lina Garcia, "Design of Non-photolithographic MEMS Devices," as part of the Undergraduate Research Opportunities Program at MIT; Spring 2010.

Ming Leong, "Design and Fabrication of a Measurement Setup to Determine Error Motions of the Carriage in a Desktop Lathe," as part of the Undergraduate Research Opportunities Program at MIT; Spring 2008.

ACADEMIC AND PROFESSIONAL ACTIVITIES

Internal Service

Mechanical Engineering Faculty Search Committee, 2014
Mechanical Engineering Computing Committee, 2014-Present
Mechanical Engineering Graduate Admissions Committee, 2014-Present
Mechanical Engineering Machine Shop Committee, 2015

External Service

Vice Chair, American Society for Precision Engineering Micro- and Nano-Technologies Technical Leadership Committee, 2015 - Present

Member, American Society for Precision Engineering Annual Meeting Scientific Committee, 2015 - Present

Member, American Society for Precision Engineering Handbook Committee, 2015 - Present

Member, American Society for Precision Engineering Student Competition Committee, 2014 - Present

Review Panelist
- NSF Nanomanufacturing Peer Review Panel
- NIST Engineering Laboratory External Proposal Review Panel

Referee for:
- IEEE Transactions on Electron Devices
- Smart Materials and Structures
- Advanced Functional Materials
- Journal of Heat Transfer
- ASME International Design Engineering Technical Conferences
- Precision Engineering
- Carbon
- Sensors and Actuators: A
- Additive Manufacturing

Organizer, MIT Laboratory for Manufacturing and Productivity Student Seminar Series, 2008-2010

Professional Society Memberships:

- American Society of Mechanical Engineers
- American Society for Engineering Education
- American Physical Society
- American Society for Precision Engineering
- European Society for Precision Engineering and Nanotechnology
- Materials Research Society
- Institute of Electrical and Electronics Engineers
- Society of Manufacturing Engineers