

Craig R. Forest
Associate Professor
The George W. Woodruff School of Mechanical Engineering
2016

I. EARNED DEGREES

Degree	Year	University	Field
Doctor of Philosophy	2007	Massachusetts Institute of Technology	Mechanical Engineering
Master of Science	2003	Massachusetts Institute of Technology	Mechanical Engineering
Bachelor of Science	2001	Georgia Institute of Technology	Mechanical Engineering

II. EMPLOYMENT

Title	Organization	Years
Short-Term Lecturer, Professional Education	Massachusetts Institute of Technology	2016-
Associate Professor	Georgia Institute of Technology	2014-present
Fellow	Allen Institute for Brain Science	2014
Principal Consultant	Atlanta Machine Design	2013-present
Assistant Professor	Georgia Institute of Technology	2008-2014
Program Faculty, Biomedical Engineering	Georgia Institute of Technology	2008-present
Program Faculty in Bioengineering	Georgia Institute of Technology	2008-present
Research Fellow in Genetics	Harvard Medical School	2007-2008
Managing Partner	Claw Hanging Systems, LLC	2007-2013
Graduate Research Assistant	Massachusetts Institute of Technology	2003-2007
Fellow, MESA Institute	Sandia National Laboratories	2003
Graduate Research Assistant	Massachusetts Institute of Technology	2001-2003
Intern	Sandia National Laboratories	2001
Undergraduate research assistant	Georgia Institute of Technology	2000-2001
Co-operative work student	NASA, Johnson Space Center	1998-2001

III. TEACHING

A. Individual Student Guidance *

Research Scientists/Research Engineers/Postdoctoral Scholars Supervised

1. Yu, Huiling, Ph.D
Post-doctoral researcher
Jan 2010-Dec 2010
Project Title: 3-D micromilling and metrology for microfluidic devices
2. Culpepper, Stephen
Research Engineer
Jan 2012-Aug 2012
Project Title: Microfluidic device fabrication and testing
3. Hotaling, Nathan, Ph.D

* Cited publications and contributions are in subsections of Section IV, unless otherwise noted

Research Engineer
Aug 2013-Dec 2013
Project Title: High-throughput in-vivo electrophysiology

4. Yang, Bo, Ph.D (in progress)
Research Scientist
Jan 2014-
Project Title: High-throughput in-vivo electrophysiology

Ph.D. Students Supervised

1. Kodandaramaiah, Suhasa
Began Advising: Fall 2009
Graduated: Fall 2012, ME (**named to Forbes Magazine Top 30 under 30, 2012**)
Dissertation: Robotics for in vivo whole cell patch clamping
Publications/Presentations: B.a.12,17,19,20; B.b.30,32 (**best paper award**),
35,38,39,40,45,46,50,55,57; E.b.11,14,17,22,25,26; F.b.9,12,13
Current position: Assistant Professor, U. Minnesota, since August 2015
2. Li, Melissa
Began Advising: Fall 2008
Graduated: Spring 2013, BME
Dissertation: Microfluidic system for thrombosis under multiple shear rates and platelet therapies
Fellowship: TI:GER Graduate Research Fellowship, 8/10-7/12
Publications/Presentations: B.a.10,21; B.b.23,24,25,29,37,42,51,56; E.b.13,19, F.b.8
Current position: Postdoctoral researcher, U. Washington, since June 2013
3. Phaneuf, Chris
Began Advising: Fall 2008
Graduated: Fall 2014, BioE, non-thesis MSME degree awarded 2012
Dissertation: Infrared laser-mediated polymerase chain reaction in a polymer microfluidic device
Qualifying exams passed Jan 2010
Fellowship: **Dept. of Homeland Security (DHS) Graduate Research Fellowship**, 8/09-7/12
Publications/Presentations: B.a.8,11,15,16; B.b.22,28,30,33,34,36,43,47,48,49,58,59; E.a.15;
E.b.12,16,18,20,24
Current position: Postdoctoral appointee, Sandia National Laboratories, since January 2015
4. Holst, Greg (in progress)
Began Advising: Fall 2011
Graduated: Fall 2016, BioE
Dissertation: In Vivo Serial Patch Clamp Robotics for Cell-Type Identification in the Mouse
Visual Cortex
Qualifying exams passed May 2012
Publications/Presentations: B.a.16,18; B.b.43,45,46,49,54,55,57; E.a.15; E.b.23,24,25,26
Current position: Research engineer, Illumina Corporation, since October 2016
5. Austin (Henegar), Caitlin
Began Advising: Summer 2012, BioE, , non-thesis MSME degree awarded 2015

Graduated: Fall 2016, BioE

Dissertation: Dynamics of molecular communication in bacteria within microfluidic environments

Fellowship: **National Science Foundation (NSF) Graduate Research Fellowship**, 8/13-8/16

Publications/Presentations: B.a.18; B.b.54; E.a.15

Current position: Research engineer, Becton, Dickinson (BD) and Company, since Jan 2017

7. Stoy, William (in progress)
Began Advising: Fall 2012, BME
Dissertation: Whole-cell electrophysiology of synaptically connected neurons in vivo
Qualifying exams passed May 2013
Fellowship: **National Science Foundation (NSF) Graduate Research Fellowship**, 8/13-8/16
Publications/Presentations: B.b.57; E.b.25,26
8. Kolb, Ilya (in progress)
Began Advising: Spring 2013, BME
Dissertation: Integrated signal amplification and acquisition for scalable patch clamping
Qualifying exams passed May 2013
Publications/Presentations: B.b.55,57; E.b.26
9. Thourson, Scott (in progress)
Began Co-advising: Fall 2013, BME (Co-advised with Prof. Christine Payne)
Project Title: Nanoparticle drugs for neuron membrane potential modulation
10. Lee, Timothy (in progress)
Began Advising: Fall 2014, ME
Project Title: High-throughput brain mapping
11. Landry, Corey (in progress)
Began Advising: Fall 2015, BME
Dissertation: Sensing and modulating gene expression in neurons
Fellowship: **National Science Foundation (NSF) Graduate Research Fellowship**, 8/15-8/18
12. Lewellen, Colby (in progress)
Began Advising: Fall 2016, ME
Dissertation: Transmembrane potential measurement of retinal pigment epithelium

M.S. Thesis Students Supervised

1. Pak, Nikita
Began Advising: Summer 2010
Graduated: Summer 2012, ME
Thesis: Simultaneous amplification of multiple DNA targets with optimized annealing temperatures
Fellowship: **National Science Foundation (NSF) Graduate Research Fellowship**, 8/11-8/12
(Georgia Tech), 8/12-7/14 (MIT)
Publications/Presentations: B.a.8,9,11,15,16; B.b.28,30,31,34,36,43,47,48,49,58;
E.b.12,15,16,18,24;
Current position: PhD candidate, MIT, since Aug 2012

2. Saunders, Daniel Curtis
 Began Advising: Fall 2010
 Graduated: Summer 2012, ME
 Thesis: Microfluidic system with open loop control for rapid infrared reverse transcription of quantitative PCR (RT-QPCR)
 Publications/Presentations: B.a.11,15,16; B.b.36,43,47,48,49,58; E.b.18,21,24;
 Current position: PhD candidate, University of Vermont, since Aug 2012

3. Capocasale, Christopher Thomas (in progress)
 Began Advising: Fall 2015, ME
 Thesis: Optically-targeted patch clamping in the barrel cortex

Visiting Graduate Students Supervised

1. Oh, Kyudam (visiting as U. Virginia PhD candidate with collaborator Prof. J. Landers)
 Jun 2011-Aug 2011
 Project Title: Sensitivity and specificity of consensus-degenerate PCR reactions in microfluidic devices
 Publications/Presentations: B.a.15; B.b.48

2. Blum, Kyle (rotation for NIH Computational Neuroscience Training Grant)
 Aug 2012-Dec 2012
 Project Title: Patch clamping electrophysiology

3. McKinnon, Michael (rotation for NIH Computational Neuroscience Training Grant)
 Jun 2013-Aug 2013
 Project Title: Signal processing for electrophysiology of neurons
 Publications/Presentations: B.a.16; B.b.29

4. Payne, Aiden (rotation for NIH Computational Neuroscience Training Grant)
 Feb 2014-May 2014
 Project Title: Automated in-vitro patch clamping

5. Jackson, Kimberly (visiting as U. Virginia PhD candidate with collaborator Prof. J. Landers)
 Jun 2015-Oct 2015
 Project Title: Nanofluidic device fabrication

Undergraduate Special Problems and Research Students Supervised

1. Johanna Przybylowski, Undergraduate research student, MIT, Sep 2001—Jun 2002
2. Guillaume Vincent, visiting undergraduate student from National Engineering School of Saint-Etienne, France, Feb 2002—Jun 2002, “Thin Foil Optic” (Diploma thesis work at MIT)
3. Michael R. Del Zio, Senior thesis student, MIT Jan 2004—Jun 2004, “Design and Testing of the Thermal Properties of the Structure of an Ultra High-Throughput Mutational Spectrometer”

4. Edward F. Hsieh, Undergraduate research student, MIT, Jul 2004—Dec 2004
5. Brian Woodruff, Undergraduate research student, MIT, Oct 2004—Jun 2005
6. Darragh Buckley, Undergraduate research student, MIT, Jun 2005—Sep 2005
7. Ian Collier, Undergraduate research student, MIT, Jan 2005—June 2005
8. Timothy W. Suen, Senior thesis student, MIT, Jan 2005—Jun 2005, “Temperature Response of the Ultra-High Throughput Mutational Spectrometer”
9. James J. Lin, Senior thesis student, MIT, Jan 2005—Jun 2005, “Manufacturing Improvement and Thermal Property Characterization of the Fr. Structure of an Ultra-High Throughput Mutational Spectrometer”
10. Nathan B. Ball, Senior thesis student, MIT, Jan 2004—Jun 2005, “Design and Characterization of a Gel Loading Mechanism for an Ultra-High Throughput Mutational Spectrometer”
11. Lohith Kini, Undergraduate research student, MIT, Feb 2006—Jun 2006
12. Maria Telleria, Undergraduate research student, MIT, Feb 2006—Sep 2006
13. Cynthia Lin, Undergraduate research student, MIT, Feb 2006—Jun 2006
14. Zachary Reynolds, Undergraduate research student, MIT, Jan 2006—Jun 2006
15. Michael Beltran, Senior thesis student, MIT, Jun 2006—Jun 2007, “One-hundred channel electrophoresis prototype for an ultra-high throughput mutational spectrometer”
16. Miguel Saez, Senior thesis student, MIT, Jun 2006—Jun 2007, “Microforging technique for rapid, low-cost manufacture of lens array molds and its application in a biomedical instrument”
17. Laura Nichols, Undergraduate research student, MIT, Jun 2007—Aug 2007
18. Phillip Lee, Undergraduate research assistant, Georgia Tech, BioMedical Engineering, Sep 2008—Sep 2009, winner **PURA undergraduate research award** (Fall 2009)
19. Michael Dergance, Undergraduate research assistant, Georgia Tech, Mechanical Engineering, Oct 2008-May 2010
20. Mark Kulik, Undergraduate research assistant, Georgia Tech, Mechanical Engineering, Jan 2009-Aug 2009
21. Daniel Shenoda, Undergraduate research assistant, Georgia Tech, Mechanical Engineering, Mar 2009-Aug 2009, winner **PURA undergraduate research award** (Summer 2009)
22. Nikita Pak, Undergraduate research assistant, Georgia Tech, Mechanical Engineering, Mar 2009-May 2010, **returned as graduate student**
23. Adam Kozak, **NSF National Nanotechnology Infrastructure Network (NNIN)** Research Experience for Undergraduates Program, University of Rochester, May 2009-Aug 2009
24. Matthew Emerick, Undergraduate research assistant, Georgia Tech, Mechanical Engineering, Aug 2009-Jul 2010
25. Michael McKinnon, Undergraduate research assistant, Georgia Tech, BioMedical Engineering, Sep 2009—Jun 2012, winner **PURA undergraduate research award** (Spring 2011), **returned as graduate student**
26. Saifullah Malik, Undergraduate research assistant, Georgia Tech, Mechanical Engineering, Jan 2010-Jun 2011
27. Stephen Chase, **NSF National Nanotechnology Infrastructure Network (NNIN)** Research Experience for Undergraduates Program, Rose-Hulman Institute of Technology, May 2010-Aug 2010
28. Jordan Thomas, Undergraduate research assistant, Georgia Tech, Mechanical Engineering, Aug 2010-Jan 2011, winner **PURA undergraduate research award** (Spring 2011)
29. Jamison Go, Undergraduate research assistant, Georgia Tech, Mechanical Engineering, Jan 2011-Jun 2011, Aug 2012-June 2013
30. Laura Seamen, **NSF National Nanotechnology Infrastructure Network (NNIN)** Research Experience for Undergraduates Program, MIT, May 2011-Aug 2011
31. Nicholas Sondej, Undergraduate research assistant, Georgia Tech, Mechanical Engineering, Jun 2011-May 2012
32. Matthew Marchese, Undergraduate research assistant, Georgia Tech, Mechanical Engineering, Nov 2011-Aug 2012, **winner UROP Materials, Supplies, and Travel grant (Summer 2012)**

33. Randy Kelly Hefelfinger, Undergraduate research assistant, Georgia Tech, Mechanical Engineering, Jan 2012-May 2012
34. Siddarth Gurnani Undergraduate research assistant, Georgia Tech, Mechanical Engineering, Jan 2012-May 2012
35. Max Lu, Undergraduate research assistant, Georgia Tech, Biomedical Engineering, Mar 2012-Jun 2012, **winner UROP Materials, Supplies, and Travel (MS&T) grant (Summer 2012)**
36. Kevin So, Undergraduate research assistant, Georgia Tech, Biomedical Engineering, May 2012-Aug 2012
37. Akhil Kumar, Undergraduate research assistant, Georgia Tech, Biomedical Engineering, Aug 2012-Dec 2012
38. Aaron Fan, Undergraduate research assistant, Georgia Tech, Electrical and Computer Engineering, Aug 2012-Dec 2012
39. Coby Lu, Undergraduate research assistant, Georgia Tech, Electrical and Computer Engineering, Aug 2012-Dec 2012
40. Marie Harber, Undergraduate research assistant, Georgia Tech, Mechanical Engineering, Jan 2013-May 2014, winner **PURA undergraduate research award** (Summer 2013)
41. Adam Dixon, Undergraduate research assistant, Georgia Tech, Electrical and Computer Engineering, Aug 2012-Dec 2012
42. Christopher Harless, Undergraduate research assistant, Georgia Tech, Electrical and Computer Engineering, Jan 2013-Dec 2013
43. Cam Phillips, Undergraduate research assistant, Georgia Tech, Mechanical Engineering, Jan 2013-May 2013
44. Andy Lustig, Undergraduate research assistant, Georgia Tech, Electrical and Computer Engineering, Jan 2013-Oct 2013, **winner UROP Materials, Supplies, and Travel grant (Summer 2013)**
45. Nikita Nagpal, Undergraduate research assistant, Georgia Tech, Biomedical Engineering, Feb 2013-May 2014, winner **PURA undergraduate research award** (Fall 2013)
46. Peter Su, **NSF National Nanotechnology Infrastructure Network (NNIN) Research Experience for Undergraduates Program**, University of California, Berkeley, May 2013-Aug 2013, winner **National Science Foundation (NSF) Graduate Research Fellowship (2015-2018)**
47. Christopher Thomas Capocasale, Undergraduate research assistant, Georgia Tech, Mechanical Engineering, Aug 2013-present, winner **PURA undergraduate research award** (Spring 2015), **Air Products Undergraduate Research Symposium Honorable Mention (4th place)** (Spring 2015).
48. Shrinka Roy, Undergraduate research assistant, Georgia Tech, Mechanical Engineering, Sep 2013-Dec 2014
49. Charles "Chad" Ramey, Undergraduate research assistant, Georgia Tech, Computer Science, Oct 2013-Jan 2014
50. Jorge E. Perdomo, Undergraduate research assistant, Georgia Tech, Biomedical Engineering, Jan 2014- Dec 2016, winner **PURA undergraduate research award** (Spring 2015, Spring 2016)
51. Lucy Hu, **NSF National Nanotechnology Infrastructure Network (NNIN) Research Experience for Undergraduates Program**, University of California, Berkeley, May 2014-Aug 2014
52. Adam Erwood, Undergraduate research assistant, Georgia Tech, Mechanical Engineering, May 2014-May 2015 **winner UROP Materials, Supplies, and Travel grant (Summer 2014)**,
53. Max Stockslager, Undergraduate research assistant, Georgia Tech, Mechanical Engineering, May 2014-Aug 2015, winner **PURA undergraduate research award** (Fall 2014), **PURA for conference travel** (Fall 2014), **Annual Mechanical Engineering Outstanding Undergraduate Researcher Award**, **College of Engineering Outstanding Undergraduate Research Award**, **National Science Foundation (NSF) Graduate Research Fellowship (2015-2018)**, **Air Products Undergraduate Research Symposium 3rd place** (Spring 2015).

54. Yonkyu Jang, Undergraduate research assistant, Georgia Tech, Biomedical Engineering, May 2014- Aug 2014
55. Alexa Deckbar, Undergraduate research assistant, Georgia Tech, Biology, May 2014-Aug 2014
56. David Caro, Undergraduate research assistant, Georgia Tech, Chemistry, Aug 2014-May 2016, winner, **Peter B. Sherry Memorial Scholarship**
57. Sagar Patel, Undergraduate research assistant, Georgia Tech, Biology, Aug 2014-May 2016
58. Zoe Klesmith, Undergraduate research assistant, Georgia Tech, Mechanical Engineering, Jan 2015-December 2015, **winner UROP Materials, Supplies, and Travel (MS&T) grant (Summer 2015)**
59. Leonard Tsai, Undergraduate research assistant, Georgia Tech, Electrical and Computer Engineering, Mar 2015-December 2015, winner **PURA undergraduate research award** (Fall 2015)
60. Erin Rousseau, **NSF National Nanotechnology Infrastructure Network (NNIN) Research Experience for Undergraduates Program**, University at Albany, SUNY, NY, May 2015-Aug 2015
61. Sage Duddleston, Undergraduate research assistant, Georgia Tech, Biomedical Engineering, Aug 2015-Dec 2015
62. Michael Wang, Undergraduate research assistant, Georgia Tech, Computer Science, January 2016-present, winner **PURA undergraduate research award** (Fall 2016)
63. William Penniman, Undergraduate research assistant, Georgia Tech, Chemistry, March 2016-Dec 2016
64. Dhara Patel, Undergraduate research assistant, Georgia Tech, Biomedical Engineering, March 2016-May 2016, Aug 2016-present, winner **PURA undergraduate research award** (Fall 2016)
65. Xiebin Gu, Undergraduate research assistant, Georgia Tech, Materials Science and Engineering, May 2016-Dec 2016
66. Jing Wu, Visiting undergraduate research assistant, Peking University, Theoretical and Applied Mechanics, July 2016
67. Sofia Switzer, Undergraduate research assistant, Georgia Tech, Chemical and Biomolecular Engineering, Aug 2016-present
68. Amanda Felouzis, Undergraduate research assistant, Georgia Tech, Biomedical Engineering, Aug 2016-present
69. Andrew Ibrahim, Undergraduate research assistant, Georgia Tech, Mechanical Engineering, Aug 2016-Dec 2016
70. Ishan Rajwade, Undergraduate research assistant, Georgia Tech, Mechanical Engineering, Aug 2016-Dec 2016
71. Ting-Wen Tsai, Undergraduate research assistant, Georgia Tech, Mechanical Engineering, Aug 2016-Dec 2016
72. Rahul Sharan, Undergraduate research assistant, Georgia Tech, Mechanical Engineering, Aug 2016-Dec 2016
73. Aatum Desai, Undergraduate research assistant, Georgia Tech, Mechanical Engineering, Aug 2016-Dec 2016
74. Jishen (Jason) Cheng, Undergraduate research assistant, Georgia Tech, Mechanical Engineering, Aug 2016-Dec 2016
75. Laura Heller, Undergraduate research assistant, Georgia Tech, Mechanical Engineering, Jan 2017-present
76. Aditi Kumar, Undergraduate research assistant, Georgia Tech, Mechanical Engineering, Jan 2017-present

B. Other Teaching Activities

Curriculum Development

(Full list of courses taught on a separate sheet as required by Georgia Tech guidelines. Novel curriculum development is described here.)

1. Capstone Design, ME 4182/GT 4823: Aug 2008-May 2014, I have initiated and led, collaborating with a team of faculty and staff, an effort to overhaul the Georgia Tech capstone design course. The course has 2000 students/year working on 400 projects/year in which they create, analyze, and build solutions. Major contributions as follows:
 - Revamped “Capstone Design Expo” and expanded it Institute-wide for student teams to compete for cash prizes as voted on by industry and academic judges, 4000 attendees per semester, 150 teams comprising six majors participating as of 2014
 - Led initiatives for multi-disciplinary capstone design teams comprising ME and BME students (Fall 2010, Fall 2011, Fall 2012) initially, and campus-wide starting Spring 2014
 - Raising ~\$500,000 in industry funds and \$1M in technology fee funds to support the course
 - Coordinated, directly-advised, or managed hundreds of real-world, research laboratory or industry sponsored projects
 - Developed and implemented lecture component for the course focusing on entrepreneurship and invention
 - Hired, collaborated with, and/or delegated authority to ~10 person team to administer the course
2. Developed new graduate level, “Applied Optics,” course number ME 8803, offered Spring 2011, Spring 2013, with students comprising three Schools within the College of Engineering.

IV. INTELLECTUAL PRODUCTS

B. Refereed Publications

a. Refereed Journal Publications:

1. Y. Sun, R.K. Heilmann, C.G. Chen, C.R. Forest and M.L. Schattenburg, Precision microcomb design and fabrication for x-ray optics assembly, *Journal of Vacuum Science and Technology B*, Vol. 21(6), p. 2970-2974, Nov/Dec 2003. (Also, B.b.4)
2. C.R. Forest, C.R. Canizares, D.R. Neal, M. McGuirk, and M.L. Schattenburg, Metrology of thin transparent optics using Shack-Hartmann wavefront sensing, *Optical Engineering*, Vol. 43(3), p. 742-753, Mar 2004. (Also, B.b.2)
3. C.R. Forest, M. Spenko, Y. Sun, A.H. Slocum, R.K. Heilmann and M.L. Schattenburg, Repeatable and accurate assembly of x-ray foil optics, *Precision Engineering*, Vol 30(1), p. 63-70, Jan 2006. (Also, B.b.5)
4. M. Akilian, C.R. Forest, A.H. Slocum, D.L. Trumper, and M.L. Schattenburg, Thin Optic Constraint, *Precision Engineering*, Vol 31(2), p. 130-138, Apr 2007. (Also, B.b.12)
5. C.R. Forest, M.A. Saez, I.W. Hunter, Microforging Technique for Rapid, Low-cost Fabrication of Lens Array Molds, *Applied Optics*, Vol 46(36), p. 8668-8673, Dec 2007 (*featured on cover*) (Also, B.b.19)
6. C.R. Forest, B. Woodruff, D. Buckley, W.G. Thilly, and I.W. Hunter, Assembly and Constraint Technology for Large Arrays of Capillaries, *Precision Engineering*, Vol 33(3), p. 275-283, Jul 2009. (Also, B.b.16)
7. H.H. Wang, F.J. Isaacs, P.A. Carr, Z.Z. Sun, G. Xu, C.R. Forest, G.M. Church, Programming cells by multiplex genome engineering and accelerated evolution, *Nature*, Vol. 460, p. 894-898, Jul 2009.

8. C.R. Phaneuf, N. Pak, C.R. Forest, Modeling radiative heating of liquids in microchip reaction chambers, *Sensors and Actuators: A. Physical*, Vol. 167(2), p. 531-536, Feb 2011. (Also, B.b.34)
9. N. Pak, M. Dergance, M. Emerick, E. Gagnon, C.R. Forest, An Instrument For Controlled, Automated, Continuous Production of Micrometer Scale Fused Silica Pipettes, *ASME Journal of Mechanical Design*, Vol. 133(6), 061006, Jun 2011. (Also, B.b.31)
10. M. Li, D. Ku, C.R. Forest, Microfluidic system for simultaneous optical measurement of platelet aggregation at multiple shear rates in whole blood, *Lab on a Chip*, Vol. 12, p. 1355-1362, Feb 2012. (Also, B.b.37,42)
11. N. Pak, C. Saunders, C.R. Phaneuf, C.R. Forest, Plug-and-play infrared laser-mediated PCR in a microfluidic chip, *Biomedical Microdevices*. Vol. 14(2), p. 427-433, Apr 2012. (Also, B.b.36,43,47)
12. S. Kodandaramaiah, G. Franzesi, B. Chow, E. Boyden*, C.R. Forest* (*co-corresponding authors), Automated whole-cell patch clamp electrophysiology of neurons in vivo, *Nature Methods*. Vol 9, p. 585–587, May 2012. (Also, B.b.40) **(over 50 articles in popular press, top 3 listed in below Section D.8,10,11)**
13. N. Hotaling, B.B. Fasse, F. Bost, C. Hermann, C.R. Forest, A quantitative analysis of the effects of a multi-disciplinary engineering capstone design course, *Journal of Engineering Education*, Vol. 101(4), p. 630-656, Oct 2012. (Also, B.b.44,50)
14. I.F. Akyildiz, F. Fekri, C.R. Forest, B. Hammer, R. Sivakumar, MONACO: Fundamentals of Molecular Nano-Communication Networks (Invited Paper), *IEEE Wireless Communications*, Vol. 19(5), p. 12-18, Oct 2012.
15. C.R. Phaneuf, K. Oh, N. Pak, D.C. Saunders, C. Conrardy, J. Landers, S. Tong, C.R. Forest, Sensitive, microliter PCR with consensus degenerate primers for Epstein Barr virus, *Biomedical Microdevices*, Vol. 14(6), p. 1-11, Oct 2012. (Also, B.b.48)
16. D.C. Saunders, G.L. Holst, C.R. Phaneuf, N. Pak, M. Marchese, N. Sondej, M. McKinnon, C.R. Forest, Rapid, quantitative, reverse transcription PCR in a polymer microfluidic chip, *Biosensors and Bioelectronics*, Vol. 44, p. 222-228, June 2013. (Also, B.b.43,47)
17. S.B. Kodandaramaiah, E.B. Boyden, C.R. Forest, In vivo robotics: Towards the automation of neuroscience and other intact-system biological fields, *Annals of the New York Academy of Sciences*, Vol. 1305, p. 63-71, December 2013.
18. B. Krishnaswamy, C.M. Austin, J.P. Bardill, D. Russakow, G.L. Holst, B.K. Hammer, C.R. Forest, R. Sivakumar, Time-elapse communication: bacterial communication on a microfluidic chip, *Institute of Electrical and Electronics Engineers (IEEE) Transactions on Communications*, Vol. 61(12), p. 5139-5151, December 2013. (Also, B.b.54)
19. M. Li, N.A. Hotaling, D.N. Ku, C.R. Forest, Microfluidic thrombosis under multiple shear rates and platelet therapy doses, *PLoS One*, Vol. 9(1): e82493 (2014).
20. A.S. Chuong, M.L. Miri, L.C. Acker, S.B. Kodandaramaiah, M.A. Henninger, M. Ogawa, R.C. Bandler, N.C. Klapoetke, X. Gu, B.D. Allen, C.R. Forest, B.Y. Chow, X. Han, J.A. Cardin, E.S. Boyden, Minimally invasive optogenetic neural silencing, *Nature Neuroscience*. Vol 17, p. 1123-1129, July 2014.
21. C.M. Austin, W. Stoy, P. Su, M.C. Harber, J.P. Bardill, B.K. Hammer, C.R. Forest, Modeling and validation of autoinducer-mediated bacterial gene expression in microfluidic environments, *Biomicrofluidics*, Vol. 8, 034116 (2014).
22. C.R. Forest, R.A. Moore, B.B. Fasse, A.S. Jariwala, B.B. Fasse, J. Linsey, W. Newstetter, P. Ngo, C. Quintero, The Invention Studio: a university maker space and culture, *Advances in Engineering Education*, Vol. 4(2), p. 1-32, Fall 2014. Translated into Chinese by Zhen-Yu She, Associate Professor of Tianjin University, China, and reproduced with permission in *J. Modern Distance Education Research*, (4): 10-23 (2015).
23. E.A. Tyburski, S.E. Gillespie, W.A. Stoy, R.G. Mannino, A.J. Weiss, A.F. Siu, R.H. Bulloch, K. Thota, A. Cardenas, W. Session, H.J. Houry, S. O'Connor, S.T. Bunting, J. Boudreaux, C.R. Forest, M. Gaddh, T. Leong, T. Leong, L.A. Lyon, W.A. Lam, Disposable platform provides visual and color-based point-of-care anemia self-testing, *The Journal of Clinical Investigation*, August 2014. doi:10.1172/JCI76666.

24. R.R. Harrison, I. Kolb, S.B. Kodandaramaiah, A.A. Chubykin, A. Yang, M.F. Bear, E.S. Boyden, C.R. Forest, Microchip amplifier for in vitro, in vivo, and automated whole-cell patch-clamp recording, *J. Neurophysiology* doi:10.1152/jn.00629.2014.
25. M.V. Baratta, S.B. Kodandaramaiah, P.E. Monahan, P.-A. Lin, K. Kim, A. Yang, C.R. Forest, E.S. Boyden, K.A. Goosens, Stress enables reinforcement-elicited serotonergic consolidation of fear memory, *Biological Psychiatry*, 2015 Jul 2, doi: 10.1016/j.biopsych.2015.06.025
26. O. Bizen, C.M. Austin, I. Akyildiz, C.R. Forest, Efficient sampling of bacterial signal transduction for detection of pulse-amplitude modulated molecular signals, *Institute of Electrical and Electronics Engineers (IEEE) Transactions on Biomedical Circuits and Systems*, Vol. 9(4), p. 505-517, August 2015.
27. C.R. Phaneuf, N. Pak, D. C. Saunders, G.L. Holst, J. Birjiniuk, N. Nagpal, S. Culpepper, E. Popler, A.L. Shane, R.C. Jerris, C.R. Forest, Thermally multiplexed polymerase chain reaction, *Biomicrofluidics*, Vol. 9, 044117 (2015). **(Selected as one of the Editor's Picks, 2015)**
28. S.B. Kodandaramaiah, G.B. Holst, I.R. Wickersham, A.C. Singer, G.T. Franzesi, M. McKinnon, C.R. Forest, E.S. Boyden, Assembly and operation of an autopatcher: a robot for automated intracellular neural recording in vivo, *Nature Protocols*, 11, 634-654 (2016). doi:10.1038/nprot.2016.007
29. Y. Ouyang, J. Li, C. Phaneuf, P. Riehl, C. Forest, M. Begley, D. Haverstick, J. Landers, Multilevel fluidic flow control in a rotationally-driven polyester film microdevice created using laser print and cut, *Lab on a Chip*, Vol. 16, p. 377-387, Jan 2016.
30. M.A. Stockslager, B.C. Samuels, R.R. Allingham, Z.A. Klesmith, S.A. Schwaner, C.R. Forest, C.R. Ethier, System for rapid, precise modulation of intraocular Pressure, toward minimally-invasive In vivo measurement of intracranial pressure, *PLoS One*, 2016 Jan 15;11(1):e0147020. doi: 10.1371/journal.pone.014702
31. M.A. Stockslager*, C.M. Capocasale* (*co-first authors), G.L. Holst, M.D. Simon, Y. Li, D.J. McGruder, E.B. Rousseau, W.A. Stoy, T. Sulchek, C.R. Forest, Optical method for automated measurement of glass micropipette tip geometry, *Precision Engineering*, Vol 46, p. 88-95, October 2016.
32. Q. Wu*, I. Kolb* (*co-first authors), B.M. Callahan, Z. Su, W. Stoy, S.B. Kodandaramaiah, R. Neve, H. Zeng, E.S. Boyden, C.R. Forest[#], A.A. Chubykin[#] ([#]co-corresponding authors), Integration of autopatching with automated pipette and cell detection in vitro, *J. Neurophysiology (in press)*. doi: 10.1152/jn.00386.2016
33. I. Kolb, W.A. Stoy, E. Rousseau, O.A. Moody, A. Jenkins, C.R. Forest, Cleaning patch-clamp pipettes for immediate reuse, *Scientific Reports* 6: 35001, 2016. doi:10.1038/srep35001 **(over 10 articles in popular press, example below in D.21, Altmetric score in 97th percentile of 133,000 articles of similar age in all journals)**

Submitted Journal Publications:

34. B. Krishnaswamy, C.M. Austin, C.R. Forest, ADMA: Amplitude-Division Multiple Access for Bacterial Communication Networks, *Institute of Electrical and Electronics Engineers (IEEE) Transactions on Communications*, (submitted)
35. A. Singer, G.T. Franzesi, S. Kodandaramaiah, F. Flores, J.D. Cohen, A.K. Lee, C. Borgers, C.R. Forest, N. Kopell, E.B. Boyden, Mesoscale activated states gate spiking in the awake brain. *J. Neurophysiology (under review)*.
36. S.B. Kodandaramaiah, F. Flores, G. Holst, A. Singer, X. Han, E. Brown, E. Boyden, C.R. Forest, Multi-neuron intracellular recording in vivo via interacting autopatching robots, *eLife (under review)*
37. H.-J. Suk, I. vanWelie, S.B. Kodandaramaiah, B. Allen, C.R. Forest, E.S. Boyden, Fully automated, closed-loop, two-photon image-guided patch clamp neural recording in vivo, *Nature neuroscience*, (under review)
38. L. Li, B. Ouellette, W. Stoy, E. Garren, T.L. Daigle, C.R. Forest, C.Koch, H. Zeng, High-yield single-cell characterization and perturbation of brain neurons *in vivo*, *Nature communications*, (under review)

39. P.Y. Borden, A.D. Ortiz, C. Waiblinger, A.J. Sederberg, A.E. Morrisette, C.R. Forest, D. Jaeger, G.B. Stanley, Genetically expressed voltage sensor ArcLight for imaging large scale cortical activity in the anesthetized and awake Mouse, *J. Neuroscience Methods*, (under review)
40. W.A. Stoy, I. Kolb, G.L. Holst, Y. Liew, A. Pala, B. Yang, S.B. Kodandaramaiah, E.S. Boyden, G.B. Stanley, C.R. Forest, Robotic navigation to sub-cortical neural tissue for single cell electrophysiology in vivo, *Neuron* (under review)
41. J. Lee, I. Kolb, C.R. Forest, C.J. Rozell, Deconvolution and Cell Membrane Identification from Time-Varying Differential Interference Contrast Microscopy of In Vitro Brain Slices, *IEEE Transactions on image processing* (under review)
42. Y. Jian, F. Fekri, B. Krishnaswamy, C.M. Austin, A.O. Bicen, A. Einolghozati, J.E. Perdomo, S.C. Patel, I.F. Akyildiz, C.R. Forest, R. Sivakumar, NanoNS3: A network simulator for bacteria nanonetworks based on molecular communication, *Nano Communication Networks* (under review)

b. Conference Publications, refereed based on conference abstract or full manuscript

1. C.R. Forest, D. Frakes, and W. Singhose, Input-Shaped Control of Gantry Cranes: Simulation and Curriculum Development, *Proceedings of the 18th ASME Biennial Conference on Mechanical Vibration and Noise*, V. 6B, p. 1877-1884, Pittsburgh, PA, Sep 9-12, 2001.
2. C.R. Forest, M.L. Schattenburg, C.G. Chen, R.K. Heilmann, P. Konkola, J. Przybylowski, Y. Sun, J. You, S.M. Kahn and D. Golini, Precision Shaping, Assembly and Metrology of Foil Optics for X-ray Reflection Gratings, *Proc. SPIE 4851, Conf. on X-ray and Gamma-ray Telescopes and Instruments for Astronomy*, p. 538-548, Wailoloa, HI, Aug 25-28, 2002.
3. R. Petre, W.W. Zhang, D.A. Content, T. T. Saha, J. Stewart, J.H. Hair, D. Nguyen, W.A. Podgorski, W.R. Davis, Jr., M.D. Freeman, L.M. Cohen, M.L. Schattenburg, R.K. Heilmann, Y. Sun and C. Forest, Constellation-X Spectroscopy X-ray Telescope (SXT), *Proc. SPIE 4851, Conf. on X-ray and Gamma-ray Telescopes and Instruments for Astronomy*, p. 433-440, Wailoloa, HI, Aug 25-28, 2002.
4. Y. Sun, C.G. Chen, R.K. Heilmann, C. Forest, M. Spenko, P.T. Konkola, M. McGuirk, C. Joo and M.L. Schattenburg, Precision microcomb design and fabrication for Constellation-X soft x-ray telescope segmented optic assembly, *Proceedings of the 17th Annual Meeting of the American Society of Precision Engineering*, p. 261-266, St. Louis, MO, Oct 20-25, 2002.
5. C.R. Forest, M.J. Spenko, Y. Sun, M. McGuirk, A.H. Slocum, and M.L. Schattenburg, Precision assembly and metrology of x-ray foil optics, *Proceedings of the 17th Annual Meeting of the American Society of Precision Engineering*, p. 244-249, St. Louis, MO, Oct 20-25, 2002.
6. Y. Sun, R.K. Heilmann, C.G. Chen, M.J. Spenko, C.R. Forest and M.L. Schattenburg, Precision microcomb design and fabrication for x-ray optics, *Proceedings of the 47th International Conference on Electron, Ion and Photon Beam Technology and Nanofabrication (EIPBN)*, Tampa, FL, May 27-30, 2003.
7. R.K. Heilmann, M. Akilian, C.-H Chang, C.G. Chen, C. Forest, C. Joo, P. Konkola, J.C. Montoya, Y. Sun, J. You and M.L. Schattenburg, Advances in reflection grating technology for Constellation-X, *Proc. SPIE 5168, Optics for EUV, X-ray, and Gamma-ray Astronomy*, p. 271-282, San Diego, CA, Aug 4, 2003.
8. C. Forest, M. Akilian, G. Vincent, A. Lamure and M.L. Schattenburg, Thin glass optic and silicon wafer deformation and kinematic constraint, *Proceedings of the 18th Annual Meeting of the American Society of Precision Engineering*, V. 30, p. 39-42, Portland, OR, Oct 26-31, 2003.
9. C.R. Forest, P. Reynolds-Browne, O. Blum-Spahn, J. Harris, E. Novak, C.C. Wong, S. Mani, F. Peter, and D. Adams, Static and Dynamic Optical Metrology of Micro-Mirror Thermal Deformation, *Proceedings of the 2004 Nanotechnology Conference and Trade Show*, V. 2, p. 363-366, Boston, MA, Mar 7-11, 2004.

10. C.R. Forest, P. Reynolds-Browne, O. Blum-Spahn, J. Harris, E. Novak, C.C. Wong, S. Mani, F. Peter, and D. Adams, Measurement of Transient Thermal Response of Micro-Mirrors, *Proceedings of Hilton Head 2004: A Solid State Sensor, Actuator and Microsystems Workshop*, p. 386-391, Hilton Head Island, SC, Jun 6-10, 2004.
11. R.K. Heilmann, M. Akilian, C.-H. Chang, C.R. Forest, C. Joo, A. Lapsa, J.C. Montoya and M.L. Schattenburg, Thin-foil reflection gratings for Constellation-X, *Proc. SPIE 5488, UV-Gamma Ray Space Telescope Systems*, p. 283-290, Glasgow, Scotland, United Kingdom, Jun 21, 2004.
12. M. Akilian, C. Forest, A. Slocum, D. Trumper and M.L. Schattenburg, Thin optics constraint, *Proceedings of the 19th Annual Meeting of the American Society for Precision Engineering*, V. 34, p. 209-212, Orlando, FL, Oct 24-29, 2004.
13. C.R. Forest, N.B. Ball, T.A. Fofonoff, and I.W. Hunter, Two-Dimensional Capillary Array Electrophoresis End-Column Fluorescence Detection, *Proceedings of the 19th International Symposium on MicroScale Bioseparations (MSB)*, p. 28, New Orleans, LA, Feb 12-17, 2005.
14. C.R. Forest, B. Crane, and I.W. Hunter, Micro-well Array Interface for Capillary Array Electrophoresis, *Proceedings of the 9th International Conference on Miniaturized Chemical and Biochemical Analysis Systems (μ TAS)*, V. 1, p. 141-144, Boston, MA, Oct 9-13, 2005.
15. C.R. Forest, B. Woodruff, and I.W. Hunter, Accurate, repeatable, and replaceable constraint of capillary arrays using a micro-fabricated device, *Proceedings of the 20th International Symposium on MicroScale Bioseparations (MSB)*, p. 129, Amsterdam, Netherlands, Jan 22-26, 2006.
16. C.R. Forest, D. Buckley, I. Collier, and I.W. Hunter, Mass assembly technology for large arrays of capillaries, *Proceedings of the 20th International Symposium on MicroScale Bioseparations (MSB)*, p. 329, Amsterdam, Netherlands, Jan 22-26, 2006. (**winner of Young Scientist Award for Best Paper**)
17. C.R. Forest, M.J. Beltran, and I.W. Hunter, Passively aligned 100-port micro-fluidic connector, *Proceedings of the 21st Annual Meeting of the American Society for Precision Engineering*, V. 39, p. 443, Monterey, CA, Oct 15-20, 2006.
18. C.R. Forest, W.G. Thilly, and I.W. Hunter, End-column detector for capillary array electrophoresis: design and application to arrays of 25, 100, and 10 000 capillaries, *Proceedings of the 21st International Symposium on MicroScale BioSeparations (MSB)*, p. 306, Vancouver, British Columbia, Canada, Jan 13-18, 2007.
19. C.R. Forest, M.A. Saez, and I.W. Hunter, Microforging technique for fabrication of low roughness mold masters for injection molded lens arrays, *Proc. SPIE, OptiFab 2007*, Rochester, NY, May 14-17, 2007.
20. C.R. Forest, M.A. Saez, and I.W. Hunter, Microlens characterization using contact profilometry and point-spread function measurement, *Proceedings of the 22nd Annual Meeting of the American Society for Precision Engineering*, V. 42, p. 307-309, Dallas, TX, Oct 14-19, 2007.
21. C.R. Forest, A.R. Rosenbaum, and G.M. Church, DNA sequencing by ligation on surface-bound beads in a microchannel environment, *Proceedings of the 12th International Conference on Miniaturized Chemical and Biochemical Analysis Systems (μ TAS)* p. 634-636, San Diego, CA, Oct 12-16, 2008.
22. C.R. Phaneuf, D. Leslie, J.P. Landers, C.R. Forest, Modeling and experimental validation of dual microfluidic chamber, infrared laser-mediated polymerase chain reaction, *Proceedings of the 23rd International Symposium on MicroScale BioSeparations (MSB)*, Boston, Massachusetts, Feb 1-5, 2009.
23. A. Sodemann, M. Li, R. Mayor, C.R. Forest, Micromilling of molds for microfluidic blood diagnostic devices, *Proceedings of the Annual Meeting of the American Society for Precision Engineering 2009*, V. 47, p. 192-194, Monterey, CA, Oct 4-9, 2009.
24. M. Li, A. Sodemann, A. Para, J. Ackerman, R. Mayor, D. Ku, C. Forest, Development of a high throughput, quantitative system for formation and measurement of occlusive thrombus, *Proceedings of the Biomedical Engineering Society (BMES) 2009*, Pittsburgh, PA, Oct 7-10, 2009.
25. M. Li, A. Sodemann, J. Ackerman, R. Mayor, C. Forest, High throughput formation and measurement of occlusive thrombus in blood, *Proceedings of the 13th International Conference on Miniaturized Chemical and Biochemical Analysis Systems (μ TAS)*, Paper #602030, ICC Jeju, Jeju, Korea, Nov 1-5, 2009.

26. M. Kulik, D. Shenoda, C. Forest, A low-cost, two-axis, precision robot for automated fluorescence in-situ hybridization assays, *Proceedings of the 2009 ASME International Mechanical Engineering Congress and Exposition, IMECE 2009*, V.2, p.119-121, Lake Buena Vista, FL, Nov 13-19, 2009.
27. C.R. Forest, M.L. Furst, R. Bellamkonda, R. Vito, The InVenture Prize: An undergraduate invention competition to encourage entrepreneurship and commercialization of student technology ventures, *Proceedings of the 14th Annual Conference of the National Collegiate Inventors and Innovators Alliance (NCIIA)*, San Francisco, CA, Mar 25-27, 2010.
28. C.R. Phaneuf, N. Pak, C.R. Forest, Rapid, Low-Cost, Microfluidic Thermocycler For High-Throughput Genetic Diagnostics, Oral Presentation, *Proceedings of the ASME 2010 Summer Bioengineering Conference (SBC 2010)*, Paper #19714, p. 57, Naples, FL, Jun 15-19, 2010.
29. M. Li, S. Chase, M. McKinnon, and C.R. Forest. Microfabrication of circular cross-section microchannels for thrombosis assays, *Proceedings of the 25th Annual Meeting of the American Society for Precision Engineering 2010*, V. 50, p. 180-183, Atlanta, GA, Oct 31-Nov 4, 2010.
30. N. Pak, C.R. Phaneuf, S.B. Kodandaramaiah, and C.R. Forest, Modulation of electromagnetic radiation using a dot matrix printer, *Proceedings of the 25th Annual Meeting of the American Society for Precision Engineering 2010*, V. 50, p. 258-260, Atlanta, GA, Oct 31-Nov 4, 2010.
31. N. Pak, M. Dergance, M. Emerick, E. Gagnon, and C.R. Forest, An instrument for controlled, automated, continuous pulling of sub-micrometer fused silica pipettes, *Proceedings of the 25th Annual Meeting of the American Society for Precision Engineering 2010*, V. 50, p. 133-135, Atlanta, GA, Oct 31-Nov 4, 2010.
32. S. B. Kodandaramaiah, S. Malik, M.J. Dergance, E.S. Boyden, C. R. Forest, Design and performance of telescoping micropipette arrays for high-throughput in vivo patch clamping, *Proceedings of the 25th Annual Meeting of the American Society for Precision Engineering 2010*, V. 50, p. 246-249, Atlanta, GA, Oct 31-Nov 4, 2010. (**winner of RV Jones Scholarship for Best Paper**)
33. C.R. Phaneuf, C.R. Forest, Direct, High-Speed Milling of Polymer Microchamber Arrays, *Proceedings of the 25th Annual Meeting of the American Society for Precision Engineering 2010*, V. 50, p. 345-347, Atlanta, GA, Oct 31-Nov 4, 2010. (**winner of ASPE Student Scholarship for paper**)
34. C.R. Phaneuf, N. Pak, C.R. Forest, Modeling and design of a microscale multiplexed temperature control system, *Proceedings of the 26th Annual Meeting of the American Society for Precision Engineering*, V. 52, p. 181-184, Denver, CO, Nov 13-18, 2011.
35. S. Kodandaramaiah, M. Krijnen, J. Go, S. Malik, N. Sondej, J.P. Khatait, R.G.K.M. Aarts, E. Boyden, D.M. Brouwer, C.R. Forest, Characterization of translation of fused silica micropipettes in non-rectilinear trajectories, *Proceedings of the 26th Annual Meeting of the American Society for Precision Engineering*, V. 52, p. 253-256, Denver, CO, Nov 13-18, 2011.
36. C.R. Phaneuf, N. Pak, C. Saunders, C.R. Forest, Rapid, independently controlled polymerase chain reaction via multiplexed laser radiation, *Proceedings of the 15th International Conference on Miniaturized Systems for Chemistry and Life Sciences (μ TAS)*, p. 1689-1692, Seattle, WA, Oct 2-6, 2011.
37. M. Li, J. Ackerman, C. Forest, Microfluidic system for multichannel optical measurement of shear induced platelet thrombosis in unfractionated blood, *Proceedings of the 15th International Conference on Miniaturized Chemical and Biochemical Analysis Systems (μ TAS)*, p. 541-543, Seattle, WA, Oct 2-6, 2011.
38. M.V. Baratta, S.B. Kodandaramaiah, P.E. Monahan, K. Kim, A. Yang, C.R. Forest, K.A. Goosens, E.S. Boyden, Effects of stress on aversive learning require temporally precise serotonergic signaling, *Proceedings of the Annual Meeting of the Society for Neuroscience (Neuroscience 2011)*, Washington, DC, Nov 12-16, 2011.
39. J. Scholvin, A.N. Zorzos, G. Talei Franzesi, S.B. Kodandaramaiah, B.D. Allen, J. Kinney, C. Moore-Kochlacs, A.C. Singer, S. Wasserman, C. Wentz, M. Yamaguchi, C.R. Forest, N. Kopell, C.G. Fonstad, E.S. Boyden, High channel-count silicon neural recording probes for 3d characterization of optogenetically modulated neural dynamics, *Proceedings of the Annual Meeting of the Society for Neuroscience (Neuroscience 2011)*, Washington, DC, Nov 12-16, 2011.

40. S.B. Kodandaramaiah, E.S. Boyden, C.R. Forest, Automated patch clamping of neurons in the mammalian brain in vivo, *Proceedings of the Annual Meeting of the Society for Neuroscience* (Neuroscience 2011), Washington, DC, Nov 12-16, 2011.
41. C.R. Forest, M.L. Furst, R. Vito, An extracurricular undergraduate invention television show and competition at Georgia Tech, *Proceedings of the 16th Annual Conference of the National Collegiate Inventors and Innovators Alliance* (NCIIA), San Francisco, CA, Mar 22-24, 2012.
42. D.N. Ku, M. Li, C. Forest, K. Hefelfinger, S. Gurnani, O. Martinez, N. Turturro, P. Gahdhi, A new microfluidic point-of-care test for multi-shear platelet thrombosis, *58th annual meeting of the Scientific & Standardization Committee (SSC) of the International Society on Thrombosis and Haemostasis* (ISTH), poster BPS08, Liverpool, UK, Jun 27-30, 2012.
43. N. Pak, G.L. Holst, C.R. Phaneuf, C. Saunders, C.R. Forest, Control Schemes for Microfluidic Viral DNA/RNA Amplification, *Proceedings of the 27th Annual Meeting of the American Society for Precision Engineering*, V. 54, p. 152-155, San Diego, CA, Oct 21-26, 2012.
44. C.R. Forest, M.M. Morrison, N. Hotaling, B.B. Fasse, C. Hermann, F. Bost, A quantitative analysis of the effects of a multi-disciplinary engineering capstone design course, *Proceedings of the Capstone Design Conference 2012*, Champaign-Urbana, IL, May 30-Jun 1, 2012.
45. S.B. Kodandaramaiah, G. Holst, G.T. Franzesi, A. Singer, I. Wickersham, X. Han, E.S. Boyden, C.R. Forest, Multipatcher: a robot for automated, simultaneous whole-cell patch-clamping of multiple neurons in vivo, *Proceedings of the Annual Meeting of the Society for Neuroscience* (Neuroscience 2012), New Orleans, LA, Oct 13-17, 2012.
46. S.B. Kodandaramaiah, I. Wickersham, S.R. Bates, A.S. Chuong, M. Ogawa, M.V. Baratta, N. Klapoetke, G. Holst, L.C. Acker, F. Yoshida, P.E. Monahan, C.R. Forest, E.S. Boyden, Autopatcher application to single cell RNA analysis and optogenetic cell type identification, *Proceedings of the Annual Meeting of the Society for Neuroscience* (Neuroscience 2012), New Orleans, LA, Oct 13-17, 2012.
47. N. Pak, C.R. Phaneuf, D.C. Saunders, C.R. Forest, Simultaneous Amplification of Multiple DNA Targets with Optimized Annealing Temperatures, *Proceedings of the Biomedical Engineering Society (BMES) 2012 Annual Meeting*, pp. OP-Sat-2-20, Atlanta, GA, Oct 24-27, 2012.
48. C.R. Phaneuf, K. Oh, N. Pak, D.C. Saunders, C. Conrardy, J. Landers, S. Tong, and C.R. Forest, Sensitive, Microliter PCR with Degenerate Primers for Respiratory Virus Detection and Discovery, *Proceedings of the Biomedical Engineering Society (BMES) 2012 Annual Meeting*, pp. P-Th-B-206, Atlanta, GA, Oct 24-27, 2012.
49. G.L. Holst, D.C. Saunders, C.R. Phaneuf, N. Pak, C.R. Forest, Sensitive, Open-loop, rapid, laser PCR system using transient thermal analysis, optimization, and environmental control, *Proceedings of the Biomedical Engineering Society (BMES) 2012 Annual Meeting*, Atlanta, GA, Oct 24-27, pp. P-Th-B-219, 2012.
50. S.B. Kodandaramaiah, A.S. Chuong, M. Ogawa, N. Klapoetke, M. Baratta, L.C. Acker, P.E. Monahan, F. Yoshida, E.S. Boyden, and C.R. Forest, Integration of automated patch clamp electrophysiology system with optogenetics for cell type identification in vivo, *Proceedings of the Biomedical Engineering Society (BMES) 2012 Annual Meeting*, pp. OP-Sat-3-3, Atlanta, GA, Oct 24-27, 2012.
51. M. Li, N. Sondej, C.R. Forest, Experimental measurement of spectral transmission of platelet thrombus in comparison to whole blood, *Proceedings of the Biomedical Engineering Society (BMES) 2012 Annual Meeting*, pp. OP-Fri-3-10, Atlanta, GA, Oct 24-27, 2012.
52. B.B. Fasse, N. Hotaling, L.F. Bost, C.D. Hermann, C.R. Forest, The case for multi-disciplinary capstone design: A quantitative analysis of the impact on job placement and product quality. *Proceedings of the Biomedical Engineering Society (BMES) 2012 Annual Meeting*, pp. OP-Th-1-16, Atlanta, GA, Oct 24-27, 2012.
53. A.R. Jones, D.F. Miranda, Y.S. Choo, J.A. Guerra, J. Chapman, Y.M. Choi, C.R. Forest, Umbrella valve design for intravenous fluid delivery system, *Proceedings of the Biomedical Engineering Society (BMES) 2012 Annual Meeting*, pp. P-Sat-B-185, Atlanta, GA, Oct 24-27, 2012.

54. B. Krishnaswamy, C.M. Henegar, J.P. Bardill, D. Russakow, G.L. Holst, B.K. Hammer, C.R. Forest, R. Sivakumar, When Bacteria Talk: Time Elapse Communication for Super-Slow Networks, *Proceedings of The Institute of Electrical and Electronics Engineers (IEEE) International Conference on Communications (ICC) - Wireless Networking Symposium (ICC'13 WN)*, Budapest, Hungary, Jun 2013.
55. I. Kolb, G. Holst, B. Goldstein, S.B. Kodandaramaiah, E.S. Boyden, E. Culurciello, C.R. Forest, Automated, in-vivo, whole-cell electrophysiology using an integrated patch-clamp amplifier, *Proceedings of the 22nd Annual Computational Neuroscience Meeting (CNS 2013)*, Paris, France, July 13-18, 2013.
56. M. Li, N.A. Hotaling, C.R. Forest, Combined effects of shear rates and platelet therapy dosage on thrombosis in a microfluidic system, *Proceedings of the Biomedical Engineering Society (BMES) 2013 Annual Meeting*, Seattle, WA, September 25-28, 2013.
57. F. J. Flores, S. Kodandaramaiah, I. Wickersham, C. Forest, E. N. Brown, E. S. Boyden. Multiple whole-cell patch clamp to study state transitions in the awake mouse. *IX Annual meeting of the Chilean Society of Neuroscience & VIII IberoAmerican Congress of Biophysics*, Valparaiso, Chile, Oct 1-4, 2013.
58. J. Go, A. Fan, C. Lu, S.B. Kodandaramaiah, G.L. Holst, W. Stoy, I. Kolb, E.S. Boyden, C.R. Forest, Fully-automated, in-vivo, single cell electrophysiology, *Proceedings of the 28th Annual Meeting of the American Society for Precision Engineering*, Saint Paul, MN, Oct 20-25, 2013.
59. C.R. Phaneuf, N. Pak, C. Saunders, E. Poplar, N. Nagpal, R. Jerris, A. Shane, C.R. Forest, Thermally-multiplexed microfluidic PCR, *Proceedings of the 17th International Conference on Miniaturized Systems for Chemistry and Life Sciences (μ TAS)*, Freiburg-Black Forest, Germany, Oct 27-31, 2013.
60. A.C. Singer, G.T. Franzesi, S. Kodandaramaiah, I. Wickersham, S. Sharma, S. Batir, N. Pak, G. Holst, C. Forest, C. Borgers, N. Kopell, E.S. Boyden, Awake Autopatching: Automatic whole cell patch clamp of hippocampal neurons in awake behaving animals, *Proceedings of the Annual Meeting of the Society for Neuroscience (Neuroscience 2013)*, San Diego, CA, Nov 9-13, 2013.
61. W. Stoy, C. Shephard, I. Kolb, G. Holst, S. Kodandaramaiah, D. Ollerenshaw, D. Millard, E.S. Boyden, G.B. Stanley, C. Forest, Multiple, in vivo patch clamp recordings along the mouse vibrissae pathway, *Proceedings of the Annual Meeting of the Society for Neuroscience (Neuroscience 2013)*, San Diego, CA, Nov 9-13, 2013.
62. J. Go, G.L. Holst, A. Fan, C. Lu, S. Kodandaramaiah, C.R. Phaneuf, W. Stoy, I. Kolb, I. Wickersham, E. S. Boyden, C. Forest, Pipette replacement robot to fully automate sequential patch clamp recordings in-vivo, *Proceedings of the Annual Meeting of the Society for Neuroscience (Neuroscience 2013)*, San Diego, CA, Nov 9-13, 2013.
63. G.L. Holst, S. Kodandaramaiah, C.R. Phaneuf, W. Stoy, I. Kolb, I. Wickersham, N. Killian, E. Buffalo, E. S. Boyden, C. Forest, Miniaturized actuation system for automated, in-vivo, patch clamp recording, *Proceedings of the Annual Meeting of the Society for Neuroscience (Neuroscience 2013)*, San Diego, CA, Nov 9-13, 2013.
64. S.B. Kodandaramaiah, F.J. Flores, I.R. Wickersham, G.L. Holst, E.N. Brown, C.R. Forest, E.S. Boyden, The Multipatcher: A robot for high-density measurement of intracellular dynamics *In vivo*, *Proceedings of the Annual Meeting of the Society for Neuroscience (Neuroscience 2013)*, San Diego, CA, Nov 9-13, 2013.
65. L. Li, B. Oullette, A. Cheng, B. Tasic, T. Nguyen, S. Sorensen, E. Boyden, C. Forest, H. Zeng. An automatic approach to manipulate genetic contents of single neurons in vivo, *Proceedings of the Annual Meeting of the Society for Neuroscience (Neuroscience 2013)*, San Diego, CA, Nov 9-13, 2013.
66. C.R. Forest, The Invention Studio: a university maker space and culture, *Proceedings of the 18th Annual Conference of the National Collegiate Inventors and Innovators Alliance (NCIIA)*, San Jose, CA, Mar 21-22, 2014.
67. C.R. Forest, A. Jariwala, J. Linsey, R.A. Moore, C. Quintero, The Invention Studio: student-led fabrication space and culture, *Proceedings of the Capstone Design Conference 2014*, Columbus, OH, May 30-Jun 1, 2014.
68. W. Stoy, G. Holst, N. Pak, C.R. Forest, Mobile tools for automated scoring and analysis at Capstone Expos, *Proceedings of the Capstone Design Conference 2014*, Columbus, OH, May 30-Jun 1, 2014.

69. I. Kolb*, G. Holst*, M.A. Stockslager, S.B. Kodandaramaiah, W. Stoy, E.S. Boyden, C.R. Forest. Linear Micro-Actuation System for Patch-Clamp Recording. *Proceedings of the 29th Annual Meeting of the American Society for Precision Engineering*. Boston, MA, Nov 9-14, 2014. *equal contribution
70. C.M. Austin, W. Stoy, P. Su, M.C. Harber, J.P. Bardill, B.K. Hammer, C.R. Forest, Modeling the effects of a microfluidic environment on GFP expression in reporter bacteria, *Proceedings of the Biomedical Engineering Society (BMES) 2014*, San Antonio, TX, Oct 22-25, 2014.
71. S.B. Kodandaramaiah, F. Flores, G. Holst, I. Wickersham, E. Brown, C.R. Forest, E.B. Boyden, The Multipatcher: A Robot for High Density Measurement of Intracellular Recordings In Vivo, *Proceedings of the Biomedical Engineering Society (BMES) 2014*, San Antonio, TX, Oct 22-25, 2014.
72. A.C. Singer, G. Talei Franzesi, S.B. Kodandaramaiah, M. Tsitsiklis, S. Sharma, D. Bozic, S. Batir, I.R. Wickersham, G.B. Holst, C.R. Forest, C. Borgers, N.J. Kopell, E.S. Boyden, Time course of subthreshold activity preceding spike generation in awake behaving mouse hippocampus, *Proceedings of the Annual Meeting of the Society for Neuroscience (Neuroscience 2014)*, Washington DC, Nov 15-19, 2014.
73. S.B. Kodandaramaiah, F.J. Flores, G. Talei Franzesi, A.C. Singer, G. Holst, I.R. Wickersham, C. Borgers, N.J. Kopell, C.R. Forest, E.N. Brown, E.S. Boyden, Automated multiple-cell patch clamp assessment of multineuron subthreshold dynamics in waking and anesthetized states, *Proceedings of the Annual Meeting of the Society for Neuroscience (Neuroscience 2014)*, Washington DC, Nov 15-19, 2014.
74. G. Holst, S.B. Kodandaramaiah, I. Kolb, W. Stoy, I. Wickersham, A. Singer, L. Li, E.S. Boyden, H. Zeng, C.R. Forest, High-throughput fully automated patch clamp robot for in-vivo electrophysiology and morphology, *Proceedings of the Annual Meeting of the Society for Neuroscience (Neuroscience 2014)*, Washington DC, Nov 15-19, 2014. **(winner of ASPE Student Scholarship for paper)**
75. A.A. Chubykin, I. Kolb, B.M. Callahan, C.R. Forest, E.S. Boyden, M.F. Bear, Automated image-guided whole-cell patch clamp technology for mapping functional neuronal circuitry, *Proceedings of the Annual Meeting of the Society for Neuroscience (Neuroscience 2014)*, Washington DC, Nov 15-19, 2014.
76. G.T. Franzesi, A. Singer, I. Kolb, S. Sharma, S. Kodandaramaiah, M. Tsitsiklis, I. Wickersham, G. Holst, D. Bozic, S. Batir, C. Forest, C. Borgers, N. Kopell, E.S. Boyden, Automated exploration of intracellular mechanisms of in vivo neural computation, *Proceedings of the Annual Meeting of the Society for Neuroscience (Neuroscience 2014)*, Washington DC, Nov 15-19, 2014.
77. F.J. Flores*, S.B. Kodandaramaiah*, I.R. Wickersham, G. Holst, G. Talei-Franzesi, A.S. Singer, N. Kopell, C. Borgers, C. Forest, Emery N. Brown, Edward S. Boyden, Effects of general anesthetics on somatosensory cortical neurons, *Proceedings of the 22nd Annual meeting of the Cognitive Neuroscience Society (CNS 2015)*, San Francisco, CA, Mar 28-31, 2015. *equal contribution
78. B. Levy, R. Morocz, R. Nagel, W. Newstetter, K. Talley, C.R. Forest, J. Linsey, University Maker Spaces: Discovery, Optimization and Measurement of Impacts, *122nd Annual Conference & Exposition of the American Society for Engineering Education (ASEE)*, Seattle, WA, Jun 14-17, 2015.
79. T.W. Barrett, M.C. Pizzico, B. Levy, R.L. Nagel, J.S. Linsey, K.G. Talley, C.R. Forest, W.C. Newstetter, A Review of University Maker Spaces, *122nd Annual Conference & Exposition of the American Society for Engineering Education (ASEE)*, Seattle, WA, Jun 14-17, 2015.
80. A. Singer, G.T. Franzesi, S. Kodandaramaiah, F. Flores, C. Forest, N. Kopell, E. Boyden, Interaction of Slow Network Integration and Fast Neural Integration Towards Spike Generation, *Proceedings of the Computational and Systems Neuroscience (Cosyne) Meeting 2015*, Salt Lake City, UT, Mar 5-8, 2015.
81. C. Capocasale, M.A. Stockslager, M.D. Simon, Y. Li, D.J. McGruder, G.L. Holst, C.R. Forest, Measurement of sub-micrometer features in borosilicate glass micropipettes, *Proceedings of the 30th Annual Meeting of the American Society for Precision Engineering*. Austin, TX, Nov 1-6, 2015. (accepted) **(winner of ASPE Student Scholarship for paper)**
82. G. Holst, W. Stoy, I. Kolb, L. Li, U. Knoblich, S.B. Kodandaramaiah, S. Sorenson, G. Harminder, T. Jarsky, J. Waters, A. Singer, B. Yang, G.T. Franzesi, E. Boyden, H. Zeng, C. Forest, Progress towards high throughput, in vivo cell-type identification using coupled electrophysiological and

- morphological properties, *Proceedings of the Annual Meeting of the Society for Neuroscience* (Neuroscience 2015), Chicago, IL, Oct 17-21, 2015.
83. G.T. Franzesi, A.C. Singer, S.B. Kodandaramaiah, E. Wu, B. Arkhurst, C.R. Forest, C. Borgers, N.J. Kopell, E.S. Boyden, Oscillatory modulation of action potential firing in hippocampal neurons of awake mice via periodic shunting inhibition, *Proceedings of the Annual Meeting of the Society for Neuroscience* (Neuroscience 2015), Chicago, IL, Oct 17-21, 2015.
 84. H.-J. Suk, I. Van Welie, C. Forest, E. Boyden, Automated two-photon guided patch-clamp electrophysiology in vivo, *Proceedings of the Annual Meeting of the Society for Neuroscience* (Neuroscience 2015), Chicago, IL, Oct 17-21, 2015.
 85. W. Stoy, B. Yang, T. Capocasale, Y. Liew, C. Whitmire, G. Stanley, C. Forest, Methods for high yield sub-cortical patch clamping in vivo, *60th Annual Meeting of the Biophysical Society (2016)*. Los Angeles, CA, Feb 27-Mar 2, 2015.
 86. I. Kolb, W.A. Stoy, E. Rousseau, O.A. Moody, A. Jenkins, C.R. Forest. Cleaning patch clamp pipettes enables their reuse. *60th Annual Meeting of the Biophysical Society (2016)*. Los Angeles, CA, Feb 27-Mar 2, 2015.
 87. J. Weinmann, H.H. Farzaneh, U. Lindemann, C.R. Forest, Survey and analysis of five leading university maker spaces, *123rd Annual Conference & Exposition of the American Society for Engineering Education* (ASEE), New Orleans, LA, June 26-29, 2016.
 88. J. Linsey, C.R. Forest et al., MAKER: How to Make a University Maker Space, *123rd Annual Conference & Exposition of the American Society for Engineering Education* (ASEE), New Orleans, LA, June 26-29, 2016.
 89. R. Morocz, B. Levy, R. Nagel, W. Newstetter, C.R. Forest, J. Linsey, Relating Student Participation in University Maker Spaces to their Engineering Design Self-Efficacy, *123rd Annual Conference & Exposition of the American Society for Engineering Education* (ASEE), New Orleans, LA, June 26-29, 2016.
 90. G.L. Holst, W. Stoy, I. Kolb, U. Knoblich, C.R. Forest, Precision pipette manipulation for automated, serial, neural recordings in vivo, *Proceedings of the 31th Annual Meeting of the American Society for Precision Engineering*. Portland, OR, Oct 23-28, 2016.
 91. Y. Jian, B. Krishnaswamy, C.M. Austin, A.O. Bicen, J.E. Perdomo, S.C. Patel, I.F. Akyildiz, C.R. Forest, R. Sivakumar, NanoNS3: Simulating Bacterial Molecular Communication Based Nanonetworks in Network Simulator 3, *3rd ACM International Conference on Nanoscale Computing and Communication*, New York, NY, September 28-30, 2016.
 92. C.M. Austin, D.M. Caro, S. Sankar, L. Hu, S. Watve, B.K. Hammer C.R. Forest, Dynamic molecular communication between bacterial colonies in microfluidic environments, *Proceedings of the Miniaturized Systems for Chemistry and Life Sciences* (μ TAS), Dublin, Ireland, Oct 9-13, 2016.
 93. Y. Liew, C.J. Whitmore, W.A. Stoy, A. Pala, A. Sederberg, A.D. Ortiz, P.Y. Borden, B. Yang, C.M. Capocasale, T. Lee, C.R. Forest, G.B. Stanley, Experimental and analytical approaches for multi-site electrophysiology in the topographically aligned thalamocortical circuit, *Proceedings of the Annual Meeting of the Society for Neuroscience* (Neuroscience 2016), San Diego, CA, Nov 12-16, 2016.
 94. T. Lee, C.M. Capocasale, P.Y. Borden, W. Stoy, C.J. Whitmire, Y. Liew, A. Pala, A.D. Ortiz, B. Yang, G.B. Stanley, C.R. Forest, Rapid cortical barrel mapping using automated multi-whisker stimulation and intrinsic optical signal imaging, *Proceedings of the Annual Meeting of the Society for Neuroscience* (Neuroscience 2016), San Diego, CA, Nov 12-16, 2016.
 95. W. Stoy, Y. Liew, B. Yang, C.J. Whitmire, A. Pala, C.M. Capocasale, T. Lee, A.D. Ortiz, P.Y. Borden, G.B. Stanley, C.R. Forest, Low access resistance subcortical whole cell recordings in vivo, *Proceedings of the Annual Meeting of the Society for Neuroscience* (Neuroscience 2016), San Diego, CA, Nov 12-16, 2016.
 96. I. Kolb, W.A. Stoy, E. Rousseau, O.A. Moody, A. Jenkins, C.R. Forest, Cleaning patch-clamp pipettes enables their reuse, *Proceedings of the Annual Meeting of the Society for Neuroscience* (Neuroscience 2016), San Diego, CA, Nov 12-16, 2016.

97. L. Li, B. Oulette, W. Stoy, E. Garren, T. Daigle, C. Forest, H. Zeng, An automated platform for single-cell electrophysiology and perturbation in vivo, *Proceedings of the Annual Meeting of the Society for Neuroscience* (Neuroscience 2016), San Diego, CA, Nov 12-16, 2016.
98. B. Yang, T. Morgan, C.J. Fahrni, C.R. Forest. High affinity copper I chelator suppresses long-term potentiation in mouse hippocampal neurons. *Proceedings of the Annual Meeting of the Society for Neuroscience* (Neuroscience 2016), San Diego, CA, Nov 12-16, 2016.
99. H.-J. Suk, I. vanWelie, S.B. Kodandaramaiah, B. Allen, C.R. Forest, E.S. Boyden, Fully automated, closed-loop, two-photon image-guided patch clamp neural recording in vivo, *Proceedings of the Annual Meeting of the Society for Neuroscience* (Neuroscience 2016), San Diego, CA, Nov 12-16, 2016.
100. J. Linsey, C. Forest, R. Nagel, W. Newstetter, K.G. Talley, S. Smith, Understanding the impact in university makerspaces. *International Symposium on Academic Makerspaces* (ISAM), Boston, MA Nov 13-16, 2016.
101. P. Zachary Ali, M. Cooke, M.L. Culpepper, C.R. Forest, B. Hartmann, M. Kohn, V. Wilczynski, The value of campus collaboration for higher education makerspaces. *International Symposium on Academic Makerspaces* (ISAM), Boston, MA Nov 13-16, 2016.
102. I. Kolb, G.T. Franzesi, M. Wang, S. Kodandaramaiah, C.R. Forest, E. Boyden, A. Singer, Repeated membrane potential patterns in the hippocampus of awake mice are related to spiking, *Proceedings of the Computational and Systems Neuroscience (Cosyne) Meeting 2017*, Salt Lake City, UT, Feb 23-26, 2017.

C. Other Publications (Trade Journals)

1. B.S. Files and C.R. Forest, Elastomer Filled With Single-Wall Carbon Nanotubes, *NASA Tech Briefs*, Vol. 28(3), p. 46, Mar 2004.
2. M. Zecchino and C.R. Forest, Quantifying Laser-Induced Thermal Deformation of a MEMS Device, *Semiconductor Manufacturing Magazine*, Vol. 5(8), p. 52-56, Aug 2004.
3. J. Macomber and C.R. Forest, Polyimide Coated Capillary Tubing: Internal Pressure Capabilities, *Liquid Chromatography Gas Chromatography Magazine*, p. 67, Sep 2006.
4. C.R. Forest, T.A. Fofonoff, and H. Moser, Brain Electrodes and DNA Mutation Discovery: How Charmilles EDM Made It Possible, *Electrical Discharge Machining (EDM) Today Magazine*, p. 16-19, Sep/Oct 2006.
5. C.R. Forest, M. Tate, S. Norris, A Maker Space of Their Own, *PRiSM Magazine*, American Society of Engineering Education, October 2014.

D. Featured in Popular Press, Books (selected)

1. N. Mokey, Retractable Bike Storage Claw, *Popular Mechanics Magazine*, DIY Rally 2007 Runners-up, Published online, p. 5. Jun 19, 2007.
2. Tech Puts Its Money Where Its Inventors Are, *Atlanta Journal-Constitution* (front page), Mar 31, 2009
3. S. Capelouto, American Idol For Nerds, *National Public Radio*, Mar 20, 2010
4. T. Harris, Wearing Strength, *CNN*, Jul 14, 2010
5. A. Konrad, Four zany ideas that could come true, *Fortune Magazine*, Vol. 165(1), p. 66, Jan 2012.
6. N. Wright, Expo of Ingenuity, *Modern Metals Magazine*, Feb 26, 2012.
7. T. Khalil, Making Makers at Georgia Tech, *White House Office of Science and Technology Policy blog*, Feb 28, 2012.
8. K. Wagstaff, Robot That Connects to Neurons Could Provide Key to Understanding the Human Brain, *TIME*, May 9, 2012.
9. G. Stix, A Robot Helps Listen In on Brain Cell Chatter, *Scientific American*, Aug 23, 2012.
10. J. Hoff, Automation and the inner workings of the brain, *Electrical Apparatus Magazine*, Sep 2012.

11. R. Kurzweil, How to Create a Mind: The Secret of Human Thought Revealed. New York:Viking, 2012.
12. L. Diamond, Georgia Tech students' inventions could bring business, jobs, *Atlanta Journal-Constitution* (front page), Mar 12, 2013
13. G. Marcus, A Laser Light Show in the Brain, *The New Yorker*, March 19, 2013.
14. E. Landau, Top brain scientist is 'philosopher at heart,' *CNN*, April 3, 2013.
15. A. Hart, Tech students have inventive incentive, *Atlanta Journal-Constitution*, Jul 7, 2013.
16. O. St. John, Student inventors graduate, pick up patents, *USA Today*, May 27, 2013.
17. D. Doherty, Lessons Learned, *Make*, Vol. 39, pp. 8, May 27, 2014.
18. R. Graham, Does teaching advance your academic career? A template for evaluating teaching achievement, Royal Academy of Engineering, ISBN: 978-1-909327-24-5, January, 2015.
19. L. Beil, Pregnancies shadowed by fears of Zika, *New York Times*, March 15, 2015.
20. H. Shen, Robots record brain activity inside neurons, *Nature*, April 1, 2016.
21. J. Toon, Robotic cleaning technique could automate neuroscience research, *EurekAlert*, October 25, 2016.

E. Presentations

a. Invited:

1. C.R. Forest, M.J. Spenko, and Y. Sun, MIT precision machine design: x-ray optics alignment project, *Dover Instrument Corporation*, Westboro, MA, Oct 12, 2001.
2. C.R. Forest, Shack-Hartmann surface metrology system, *Zygo Corporation*, Milford, CT, Jul 28, 2002.
3. M. Akilian, C.-H. Chang, C. Chen, C.R. Forest, R.K. Heilmann, C. Joo, P. Konkola, J. Montoya, Y. Sun, and M.L. Schattenburg, Nanometer precision metrology and constraint of thin optics for a high resolution x-ray telescope, Institute for Experimental Physics, Technische Universität Graz, Graz, Austria, Jul 15, 2004.
4. C.R. Forest, Towards a 10,000 channel ultrahigh throughput mutational spectrometer for human genetic diagnostics, *University of California*, Berkeley, CA, Jun 17, 2005 (*invited*).
5. C.R. Forest, Ultra-high throughput DNA mutation discovery, MIT Small Talks Seminar Series, Cambridge, MA, Jul 12, 2006.
6. C.R. Forest, Towards a 10,000 channel ultrahigh throughput mutational spectrometer for human genetic diagnostics, *Rice University*, Houston, TX, November, 2006 (*invited*).
7. C.R. Forest, Towards a 10,000 channel ultrahigh throughput mutational spectrometer for human genetic diagnostics, *Columbia University*, New York, NY, December, 2006 (*invited*).
8. C.R. Forest, Towards a 10,000 channel ultrahigh throughput mutational spectrometer for human genetic diagnostics, *Vanderbilt University*, Nashville, TN, December, 2006 (*invited*).
9. C.R. Forest, Towards a 10,000 channel ultrahigh throughput mutational spectrometer for human genetic diagnostics, *University of North Carolina*, Charlotte, NC, February, 2007 (*invited*).
10. C.R. Forest, Towards a 10,000 channel ultrahigh throughput mutational spectrometer for human genetic diagnostics, *North Carolina State University*, Raleigh, NC, February, 2007 (*invited*).
11. C.R. Forest, Towards a 10,000 channel ultrahigh throughput mutational spectrometer for human genetic diagnostics, *Georgia Institute of Technology*, Atlanta GA, November, 2007 (*invited*).
12. C.R. Forest, Towards a 10,000 channel ultrahigh throughput mutational spectrometer for human genetic diagnostics, *Harvard University*, Cambridge, MA, November, 2007 (*invited*).
13. C.R. Forest, Ultra-high throughput instrumentation for DNA mutation detection and sequencing, *Emory University*, Atlanta, GA, Sep 15, 2008.
14. C.R. Forest, Ultra-high throughput instrumentation for DNA mutation detection and sequencing, *University of Virginia*, Charlottesville, VA, Sep 19, 2008 (*invited*).
15. C.R. Forest, Genetic instrumentation for high throughput sensing and control, *University of Michigan*, Ann Arbor, MI, Oct 27, 2009.

16. C.R. Forest, Genetic instrumentation for high throughput sensing, PCR, and control, *Centers for Disease Control and Prevention (CDC)*, Atlanta, GA, Oct 26, 2010.
17. C.R. Forest, Genetic instrumentation for high throughput sensing and control, *MIT*, Cambridge, MA, Jan 28, 2011.
18. C.R. Forest, Automated Whole-cell Patch Clamp Electrophysiology of Neurons in vivo, *Atlanta Chapter of the IEEE Engineering in Medicine and Biology Society (EMBS)*, Atlanta, GA, Apr 17, 2012.
19. C.R. Forest, Automated Whole-cell Patch Clamp Electrophysiology of Neurons in vivo, *Konkuk University*, Seoul, Korea, Apr 23, 2012.
20. C.R. Forest, Automated Whole-cell Patch Clamp Electrophysiology of Neurons in vivo, *Yonsei University*, Seoul, Korea, Apr 25, 2012.
21. C.R. Forest, Automated patch clamp electrophysiology of neurons in the living brain, *Georgia State University*, Atlanta, GA, Oct 5, 2012.
22. C.R. Forest, Automated patch clamp electrophysiology of neurons in the living brain, *Allen Institute for Brain Science*, Seattle, WA, Mar 15, 2013.
23. C.R. Forest, C.M. Henegar, J.P. Bardill, C. Phaneuf, G.L. Holst, B.K. Hammer, Empirical measurement of molecular communication between bacteria on a microfluidic chip, 1st International Summer School on Nanocommunications, *Tempere University of Technology*, Tampere, Finland, May 21-23, 2013.
24. C.R. Forest, Automated patch clamp electrophysiology of neurons in the living brain, *University of Pennsylvania*, 2013-2014 Bioengineering Seminar series, Philadelphia, PA, Oct 24, 2013.
25. C.R. Forest, Automated patch clamp electrophysiology of neurons in the living brain, *University of California San Diego*, Department of Bioengineering Seminar Series, San Diego, CA, Feb 28, 2014.
26. C.R. Forest, A culture of invention and making as a defining characteristic of a 21st century technological education, *Washington State University*, Department of Mechanical Engineering, Pullman, WA, Nov 3, 2014.
27. C.R. Forest, Automated patch clamp electrophysiology of neurons in the living brain, *North Carolina State University*, Department of Mechanical Engineering and Aerospace Engineering Seminar Series, Raleigh, NC, Apr 24, 2015.
28. C.R. Forest, The possibilities enabled by student empowerment and ownership. *International Symposium on Academic Makerspaces (ISAM)*, Boston, MA Nov 13-16, 2016.

b. Symposia:

1. Y. Sun, O. Mongrard, C. Chen, R.K. Heilmann, C. Forest, J. You, M. Spenko and M.L. Schattenburg, Silicon microcombs for precision x-ray foil assembly, presented at the *Constellation X Mission Facility Science Team Meeting*, NASA Goddard Space Flight Center, Greenbelt, MD, Nov 15-16, 2001.
2. C.R. Forest, A. Lapsa, O. Mongrard, J. Przybylowski, M. Spenko, Y. Sun, J. You, and M.L. Schattenburg, X-ray reflection grating update, presented at the *Constellation X Mission Facility Science Team Meeting*, NASA Goddard Space Flight Center, Greenbelt, MD, Nov 15-16, 2001.
3. C.R. Forest, C.C. Henderson, B.E. Mills, and T.R. Kurfess, LIGA gold mask metrology, *Sandia National Laboratories*, Microsystems Processing Division, US Department of Energy, Livermore, CA, Jul 26, 2001.
4. C.R. Forest, M.J. Spenko, Y. Sun, A.H. Slocum, R.K. Heilmann, M.L. Schattenburg and D. Golini, X-ray reflection gratings: shaping, metrology, assembly, presented at the *Constellation X Mission Facility Science Team Meeting*, Cambridge, MA, Sep 19, 2002.
5. Y. Sun, R.K. Heilmann, C.G. Chen, M.J. Spenko, C.R. Forest, and M.L. Schattenburg, Precision microcomb design and fabrication for x-ray optics assembly, presented at the *MIT Microsystems Technology Laboratories Student Research Review*, Dedham, MA, Jan 28, 2003.
6. R.K. Heilmann, C.-H. Chang, Y. Sun, C.G. Chen, C.R. Forest, P.T. Konkola, C. Joo, J. Montoya, M. Akilian, J. You, E. Murphy, R. Fleming, and M.L. Schattenburg, Con-X reflection gratings: process

- development updates, presented at the *Constellation X Mission Facility Science Team Meeting*, Columbia University, New York, NY, May 7-8, 2003.
7. C.R. Forest, Metrology and testing of optical MEMS, *Sandia National Laboratories*, RF Microsystems Technologies Department US Department of Energy, Albuquerque, NM, Aug 25, 2003.
 8. R.K. Heilmann, M. Akilian, C.-H. Chang, C.R. Forest, C. Joo, J.C. Montoya, A. Torkaman, and M.L. Schattenburg, Reflection gratings development update, presented at the *Constellation X Mission Facility Science Team Meeting*, NASA Goddard Space Flight Center, Greenbelt, MD, Nov 20, 2003.
 9. A.M. Rosenbaum, C.R. Forest, G.M. Church, Next-Generation DNA sequencing with femtoliter reagent volumes per base per template, MIT-Harvard Medical School Microsystems Symposium, Boston, MA, Apr 4, 2008.
 10. C.R. Forest, A.M. Rosenbaum, G.M. Church, Next-Generation DNA sequencing with femtoliter reagent volumes per base per template, Harvard Medical School Genetics Department Retreat, Newport, RI, May 27-29, 2008.
 11. S. B. Kodandaramaiah, M. Dergance, C.R. Forest and E.S. Boyden, Micropipette array for scalable, parallel, in vivo patch clamping of multiple neurons in the mammalian brain. Georgia Tech Research and Innovation Conference (gtRIC), Atlanta, GA, Feb 8, 2010.
 12. C.R. Phaneuf, N. Pak, C.R. Forest, Arrayed, independently-controlled PCR thermocycling in a polymeric microchip, Poster Presentation, Georgia Tech Research and Innovation Conference (gtRIC) 2010, Atlanta, GA, Feb 8, 2010.
 13. M. Li, A. Kozak, M. McKinnon, A. Sodemann, J. Ackerman, D.N. Ku, J.R. Mayor, and C.R. Forest. Low-volume, rapid instrumentation for measurement of platelet accumulation in whole blood. Georgia Tech Research and Innovation Conference (gtRIC), Atlanta, GA, Feb 8, 2010.
 14. S. B. Kodandaramaiah, C.R. Forest and E.S. Boyden, Micropipette array for scalable, automated, parallel, in vivo patch clamping of multiple neurons in the mammalian brain. Georgia Tech Research and Innovation Conference (gtRIC), Atlanta, GA, Feb 8, 2011. **(winner Travel Award for Outstanding Poster Presentation)**
 15. N. Pak, M.J. Dergance, M.T. Emerick, E.B. Gagnon, and C.R. Forest, An Instrument For Controlled, Automated, Continuous Production of Micrometer Scale Fused Silica Pipettes, Georgia Tech Research and Innovation Conference (gtRIC), Atlanta, GA, Feb 8, 2011.
 16. C.R. Phaneuf, N. Pak, C.R. Forest, An instrument for multi-temperature, multi-chamber, and micro-liter amplification of RNA/DNA, Proceedings of the Workshop on Novel Sampling and Sensing for Improving Food Safety, Atlanta, GA, Jun 16-17, 2011, p. 79-80.
 17. S. Kodandaramaiah, G. Franzesi, B. Chow, E.S. Boyden, C.R. Forest, Automated whole-cell patch clamp electrophysiology of neurons in vivo, 2011 Collaborative Research in Computational Neuroscience (CRCNS) PI Meeting, *Princeton University*, Princeton, NJ, Oct 9-11, 2011.
 18. N. Pak, C.R. Phaneuf, D. Curtis Saunders, and C.R. Forest, Dual independent temperature control of infrared PCR. Georgia Tech Research and Innovation Conference (gtRIC), Atlanta, GA, Feb 7, 2012.
 19. M. Li, D.N. Ku, C.R. Forest, Microfluidic system for simultaneous optical measurement of platelet aggregation at multiple shear rates in whole blood. Georgia Tech Research and Innovation Conference (gtRIC), Atlanta, GA, Feb 7, 2012.
 20. C. R. Phaneuf, C. Conrardy, S. Tong, C. R. Forest, Rapid, microfluidic viral screening using Consensus-Degenerate Hybrid Oligonucleotide Primer PCR. Georgia Tech Research and Innovation Conference (gtRIC), Atlanta, GA, Feb 7, 2012.
 21. D.C. Saunders, C.R. Forest, Integrated microfluidic system with open loop control for rapid and repeatable infrared RT-qPCR. Georgia Tech Research and Innovation Conference (gtRIC), Atlanta, GA, Feb 7, 2011.
 22. S. B. Kodandaramaiah, G. Talei Franzesi, B.Y. Chow, E.S. Boyden and C.R. Automated whole cell patch clamping of neurons in vivo. Georgia Tech Research and Innovation Conference (gtRIC), Atlanta, GA, Feb 7, 2012. **(won Travel Award for Outstanding Poster Presentation)**
 23. G. L. Holst, D. Russakow and C. R. Forest, Molecular Nano-Network. Georgia Tech Research and Innovation Conference (gtRIC), Atlanta, GA, Feb 7, 2012.

24. N. Pak, G.L. Holst, C.R. Phaneuf, D.C. Saunders, C.R. Forest, Control schemes for microfluidic viral DNA/RNA amplification, Southern Section of Association of Official Agricultural Chemists (AOAC) International Meeting, Atlanta, GA, Apr 29-May 1, 2012.
25. G. L. Holst, S. B. Kodandaramaiah, W. Stoy, E. S. Boyden, C. R. Forest, Automated, high-throughput recording of neuron electrical activity in the living brain. Georgia Tech Research and Innovation Conference (gtRIC), Atlanta, GA, Feb 13, 2013.
26. W. Stoy, S. Kodandaramaiah, G. Holst, I. Kolb, E. S. Boyden, C. R. Forest, Automated in-vivo Electrophysiology for Pharmacology. Georgia Tech Research and Innovation Conference (gtRIC), Atlanta, GA, Feb 13, 2013.
27. E.S. Boyden, H. Zeng, C.R. Forest, High-throughput robotic analysis of integrated neuronal phenotypes. 1st Annual NIH Single Cell Analysis Meeting, Bethesda, MD, Apr 15-16, 2013.
28. H. Zeng, C.R. Forest, E.S. Boyden, High-throughput robotic analysis of integrated neuronal phenotypes. 2nd Annual NIH Single Cell Analysis Meeting, Rockville, MD, Apr 21-22, 2014.
29. C.R. Forest, H. Zeng, E.S. Boyden, Fully-automated sequential patch clamp recordings in-vivo and progress towards miniaturization, 2nd Annual NIH Single Cell Analysis Meeting, Rockville, MD, Apr 21-22, 2014.
30. W. Stoy, C. Whitmire, B. Yang, T. Lee, G.B. Stanley, C.R. Forest, In-vivo circuit activity measurement at single cell, subthreshold resolution, BRAIN Initiative Investigators Kickoff Meeting, Bethesda, MD, Nov 20-21, 2014.
31. W. Stoy, C. Whitmire, P. Borden, A. Ortiz, Y. Liew, B. Yang, T. Lee, G.B. Stanley, C.R. Forest, In-vivo circuit activity measurement at single cell, subthreshold resolution, BRAIN Initiative Investigators Meeting, Bethesda, MD, Dec 10-11, 2015.
32. C.R. Forest, Makerspaces, 2016 Global Consortium of Entrepreneurship Centers Conference, Rochester Institute of Technology, Rochester, NY, October 1, 2016.

F. Other Scholarly Accomplishments

a. Patents and Non-Provisional Patent Applications:

1. C.R. Forest, I.W. Hunter, N.B. Ball, and W.G. Thilly, End-Column Fluorescence Detection for Capillary Array Electrophoresis. U.S. Patent Application 11/351,669, Publication number US 2006/0176481 A1, filed Feb 10, 2006.
2. C.R. Forest, D.E. Moeller, Actuatable holding system, U.S. Patent 7,883,068, filed Oct 25, 2007 and issued Feb 8, 2011. **(Licensed to Whirlpool Corporation)**
3. C.R. Forest, D.E. Moeller, Body for an actuatable holding system, U.S. Patent D605,028, filed Aug 5, 2008 and issued Dec 1, 2009. **(Licensed to Whirlpool Corporation)**
4. C.R. Forest, D.E. Moeller, Arm for an actuatable holding system, U.S. Patent D604,596, filed Aug 5, 2008 and issued Nov 24, 2009. **(Licensed to Whirlpool Corporation)**
5. C.R. Forest, D.E. Moeller, Actuatable holding system, U.S. Patent D604,595, filed Aug 5, 2008 and issued Nov 24, 2009. **(Licensed to Whirlpool Corporation)**
6. S.M. Collins, C.R. Forest, G.E. Garrison, G.A. Gaska, D.E. Moeller, M.J. Scherzer, Lever lock slotwall storage device, U.S. Patent 8,070,118, filed Dec 18, 2009 and issued Dec 6, 2011. **(Licensed to Whirlpool Corporation)**
7. S.M. Collins, C.R. Forest, G.E. Garrison, G.A. Gaska, D.E. Moeller, M.J. Scherzer, Lever lock slotwall storage device, U.S. Patent 8,240,623, filed Sep 22, 2011 and issued Aug 14, 2012. **(Licensed to Whirlpool Corporation)**
8. C.R. Forest, D. Ku, M. Li, Microfluidic system for optical measurement of platelet aggregation, Provisional 60/249,766 filed October 1, 2011 (GTRC ID 5030), utility application 13/632,953 filed Oct 1, 2012.

9. S. Kodandaramaiah, E. Boyden, C. R. Forest, B.Y. Chow, G.T. Franzesi, Autopatcher: A robot for automated whole-cell patch clamp electrophysiology of neurons in vivo, Provisional 61558841, filed Nov 11, 2011 (MIT Docket number MIT_15251TJ), utility application 13/676082, filed Nov 12, 2012. **(ongoing licensing negotiations with Neuromatic Devices)**
10. I. Kolb, W.A. Stoy, E. Rousseau, C. R. Forest, Systems and Methods Enabling Patch-Clamp Re-use, Provisional 62202858, filed Aug 9, 2015, utility application 15/232,770, filed August 9, 2016. (GTRC reference no: 7060).

b. Provisional Patents and Invention Disclosures:

11. C.R. Forest, I.W. Hunter, Micro-well array with integrated lenslets, Invention Disclosure filed, Sep 2008 with MIT Office of Technology Licensing.
12. C.R. Forest, J.L Landers, Instrument for Independent Temperature Control of Multiple Unique Polymerase Chain Reactions In The Microfluidic Format Using Infrared Radiation, Invention Disclosure filed, March 2009 with Georgia Tech Technology Licensing Office. Provisional 61/250,690 filed Oct 12, 2009 (GTRC ID 4783).
13. C.R. Forest, M. Dergance, S.B. Kodandaramaiah, E.S. Boyden, Micropipette array for scalable, parallel, in vivo patch clamping of neurons in the mammalian brain, Invention Disclosure filed, Jan 2010 with MIT Office of Technology Licensing.
14. S. Kodandaramaiah, E. Boyden, C. R. Forest, Autopatcher: A robot for automated whole-cell patch clamp electrophysiology of neurons in vivo-CIP, Provisional 61/726008, filed Nov 12, 2012 (MIT Docket number MIT_15251TJ-CIP)
15. R. Ethier, R. Rand Allingham, C.R. Forest, G. Holst, Minimally invasive measurement of intracranial pressure, Invention Disclosure filed, Jul 2014 with Georgia Tech Office of Technology Licensing.
16. H.-J. Suk, E. Boyden, I.v. Welie, S. Kodandaramaiah, B. Allen, C. Forest, Image-guided, closed-loop robotic system for automated whole-cell patch clamp electrophysiology of neurons in vivo, Invention Disclosure filed, Jul 6, 2016 with MIT Office of Technology Licensing. Provisional patent filed Ser. No 62/359155, MIT Ref. No 18913JT, docket No 0567541030PROV

V. SERVICE

A. Professional Contributions

National Leadership

Keynote speaker (invited), National Instruments Leaders (NILeaders) event, Atlanta, GA, April 14, 2011

Keynote speaker at Smithsonian National Museum of American History, Lemelson Center for the Study of Invention and Innovation, Spaces of Invention Exhibit, Washington, DC, March 23, 2013.

Invited to White House along with 100 other US neuroscientists for announcement of BRAIN neuroscience initiative by President Barack Obama, Washington, DC, April 2, 2013.

Invited to White House to serve on a four-member panel on Building out the Team for Making It in America: Collaboration among Organized Labor, Universities and the Maker Movement, Washington, DC, September 17, 2013.

Keynote speaker (invited), NSF Epicenter Pathways to Innovation Project: multi-day workshop for 12 universities engaged in transformational innovation and entrepreneurship programs to teach them how to implement the Capstone Design, InVenture Prize, and Invention Studio projects described above. Hosted by the National Collegiate Inventors and Innovators Alliance (NCIIA). Phoenix AZ, Feb 26-27, 2014, as well as Feb 17-18, 2015. Also hosted several “topical workgroups” of faculty to coach them individually on starting their own maker spaces and competitions.

Keynote speaker (invited), NeuroFutures Summit: Closing the Loop between Brain Mapping, Neuromodulation, and Brain Computer Interfaces, “ High Throughput Neurotechnologies,” Seattle, WA, June 17-18, 2014.

Invited to White House to attend inaugural White House Maker Faire, where Georgia Tech student Partha Unnava met and chatted one-on-one with President Obama, Washington, DC, June 18, 2014

Keynote speaker at the White House, Historically Black Colleges and Universities (HBCU) Maker Workshop, Making at Universities and the Maker Universities Strategic Plan, September 17, 2014.

Associate Editor, Journal of the International Societies for Precision Engineering and Nanotechnology, 2015-present

Panel moderator, Horizons in Neuroscience Investment and Innovation, Neurolaunch Investor Demo Day, Atlanta, GA, February 4, 2015

Keynote speaker (invited), Kavli Futures Symposium “Emerging Technologies for Neuroscience: Building the New Brain Science” Santa Barbara, CA, June 27-28, 2015

Panelist, MIT alumni panel, Faculty Forum Online, Alumni Edition, Massachusetts Institute of Technology, July 24, 2015

Workshop co-organizer and co-host/instructor (with Prof. Martin Culpepper, MIT) Makerspaces 101, Venturewell, Portland, OR, March 6, 2016

Professional Education co-organizer and co-host/instructor, Making Makerspaces, MIT, Cambridge, MA, Mar 20-22, 2016

Electrical and Computer Engineering Department Heads Annual Meeting: Invited attendee and speaker, Mar 17-21, 2017, Hilton Sandestin Beach, Miramar Beach Florida

Founding member and co-organizer, Higher Education Makerspace Initiative (HEMI), International Symposium on Higher Education Makerspaces (ISAM), Panel moderator at ISAM on Makerspace Staffing, Invited talk (Staffing models), 2016

Professional Society Memberships

1996-	Member, American Society of Mechanical Engineering (ASME)
2002-	Member, American Society for Precision Engineering (ASPE)
2004-	Member, California Separation Science Society (CASSS)
2011-	Member, Biomedical Engineering Society (BMES)

2013- Member, Society for Neuroscience (SfN)
2013- Member, New York Academy of Sciences (NYAS)
2015- Member, American Society for Engineering Education (ASEE)

Professional Society Conference Organization

American Society for Precision Engineering (ASPE)

2007-2009 Scholarship committee member
2008 Annual meeting organizing committee member
2008 Session chair, Biomedical Devices and BioInstrumentation, Annual meeting
2010 Annual meeting organizing committee member
2013 Annual meeting organizing committee member
2014-2016 Board of Directors, Director-at-large, Awarded Certificate of Appreciation for contributions to the Society, Oct 26, 2016
2014 Session chair, Annual meeting
2015 Annual meeting organizing committee member

Capstone Design Conference

2012 Panelist
2014 Annual meeting organizing committee member
2014 Panelist

Intl. Conference on Miniaturized Systems for Chemistry and Life Sciences (μ TAS)

2011 Student scholarship committee member and fundraiser for Japanese researchers affected by the 2011 tsunami

National Collegiate Inventors and Innovators Alliance (NCIIA), VentureWell

2012 University Innovation Summit organizing committee
2013 Session chair, Competitions track, Annual Meeting
2013 Panelist, Annual meeting
2014 Panelist, Annual meeting

Various

2012 ASME iShow steering committee member
2013 Member of ACM NanoCom 2014 Technical Program Committee Atlanta GA, May 6-9, 2014 (inaugural meeting),

Reviewer

Funding agencies

- National Science Foundation, CBET panel, Biomedical Engineering division, Jun 2010, Oct 2010
- National Collegiate Inventors and Innovators Alliance (NCIIA), VentureWell, June 2011, Jan 2012, Jan 2015
- American Heart Association, Apr 2012, Oct 2012
- National Institutes of Health, CSR, IRG, Aug 2014; NIMH R25, June 2015; BRAIN Initiative RFA 003/004 July 2015; ZRG1 IMST-B Special Emphasis Panel: Shared Instrumentation – Miscellaneous, Nov 2015; NIMH R25 RFA-MH-16-700 BRAIN Initiative Short Courses in Computational Neuroscience, Feb 2016

- University of California Davis Grand Challenge Initiative in Brain Science (BRAIN-STIM), Feb 2015

Journals and associated conferences

- J. Optical Engineering
- J. Precision Engineering
- J. Chromatography A
- J. Electrophoresis
- ASME Journal of Mechanical Design
- Sensors & Actuators: A. Physical
- Sensors & Actuators: B. Chemical
- Lab on a Chip
- IEEE Transactions on Biomedical Circuits and Systems
- Journal of The Electrochemical Society
- Capstone Conference
- Biomedical Engineering Society (BMES)
- Nanoletters
- Advances in Engineering Education (ASEE)
- Journal of Micromechanics and Microengineering
- PloS One
- Review of Scientific Instruments

B. Campus Contributions

Institute-wide

The InVenture Prize @ Georgia Tech (2008-present)

Founding member and member of faculty organizing committee with Profs. Ray Vito, Ravi Bellamkonda, and Merrick Furst. The InVenture Prize @ Georgia Tech is an undergraduate invention competition, and it is the largest university invention competition in the United States.

Called “American Idol for Nerds” by National Public Radio (NPR), every year 500+ undergraduate inventors compete for \$30k in prizes and free patents in front of 1200 audience members in person (including 300 local K-12 students), and 50,000 TV viewers of a live broadcast through partnership with Georgia Public Broadcasting. The competition includes 80 faculty judges, 50 member staff, 3 members of faculty organizing committee, \$200,000 budget, 9 week “InVenture Prize School” for all competitors, and direct communication with 80,000 K-12 teachers in GA. Assisted with expansion to K-12 (InVenture Challenge) with 1000+ K-12 students competing each year in Georgia, as well as expansion to 15 Atlantic Coast Conference Universities (ACC InVenture Prize) with 4000 student competitors in 2016 and live television broadcast available in tens of millions of American homes in 10 states on public broadcasting affiliate stations.

Selected press coverage in IV.D.

Invention Studio and Makers Club (2008-present)

Initiated and led the Invention Studio, a 2500 ft² prototype fabrication facility with high-end prototyping fabrication equipment used by 1000 students/week. The students use the facilities 24 hrs/day for free free-to-use for extracurricular projects as well as in 25 classes/semester from across

campus. Supported the founding of, and serve as faculty advisor to the “Makers Club”, a 100 undergraduate student organization to operate the Invention Studio. Raised the following funds to support the facility:

- Georgia Tech Technology Fee funds for fabrication tools: 3-D printers, laser cutters, CNC machine tools, etc, as follows:
 - 183,737 for AY2009/10
 - 37,532 for AY2010/11
 - 89,540 for AY2011/12
 - 134,454 for AY2012/13 in partnership with Dr. Amit Jariwala
 - 180,220 for AY2013/14 in partnership with Dr. Amit Jariwala
 - 264,081 for AY2014/15 in partnership with Dr. Amit Jariwala
- ~\$500,000 cash and ~\$200,000 in donated equipment from corporate and academic sponsors

These facilities, infrastructure, and cultural transformation have been recognized by the White House (See IV.D.8); they are being replicated across campus (e.g., Dr. Starner in CoC, Dr. Budd in ID) and at other universities (e.g., MIT, Vanderbilt, RPI, Middle Tennessee State U, Tallinn U. of Technology); they are laying the groundwork for campus-wide design initiatives including a proposed new building (the “Burdell Center”); and they have directly led to the funding of a \$7.3M NSF AMP-IT-UP grant. The Invention Studio is demonstrating the value and sustainability of hand-on, design, build engineering education to stimulation innovation, creativity, and entrepreneurship in undergraduates.

Other Institute-wide contributions

- Judge for the “Ramblin’ Wreck” Parade, Homecoming 2009
- Faculty Associate in Grand Challenges Living Learning Community (GCLLC), a 110 freshmen dormitory community, 2012-2013
- Member of Qualifying Exam Committees, ME, BioE, BME, 2008-present
- Collaborated with Judith Norback, Oral Communication Excellence for Engineers and Scientists, scheduled for publication by Morgan and Claypool, August 2013.
- Institute for Bioengineering and Biosciences (IBB) Neuroscience Workshop co-organizer, 2013
- Served on Institute-wide Neuro@GT task force charged with outlining a vision and strategy for neuroengineering and neuroscience at Georgia Tech, 2014
- Dinner Jackets Host and Co-Host, Student Alumni Association dinner program for groups of 8-10 undergraduates, 2014-2015
- Neural Engineering Center Executive Committee member. The Neural Engineering Center is a Georgia Tech Interdisciplinary Research Center, 2015-present
- Co-founder and co-director of Neuro Design Suite-a core facility within the Institute for Bioengineering and Biosciences to support neuroengineering and neuroscience tool development and testing, 2014-present
- **Guest lecturer**
 - ME 3141, “Cutting Edge Technologies”, Feb 11, 2010
 - GT1000, Innovation and Entrepreneurship: Georgia Tech culture, opportunities, and YOU. Oct 12, 2010
 - ME 6229, “Introduction to MEMS”, Sep 7, 2011
 - BMED 4400: NeuroEngineering Fundamentals, Feb 20, 2012, Feb 18, 2013
 - ME 7757, “Teaching Practicum”, Sep 13, 2012, Sep 12, 2013
- **Reviewer**
 - Georgia Tech Fund for Innovation in Research and Education (GT-FIRE) grant program, Feb 2012

- Georgia Tech Regenerative Engineering and Medicine (REM) Center Innovative Research Grants, Aug 2012
- Children's Healthcare of Atlanta and Georgia Tech Center for Pediatric Innovation seed grant program, May 2013
- **Thesis committees**
 - Jamie Huffman (advisor Prof. Brandon Dixon), M.S.M.E, Fall 2011
 - Massimiliano Pierobon (advisor Prof. Ian Akyildiz), Ph.D. Electrical and Computer Engineering, Summer 2013
 - Lauren Casa (advisor Prof. David Ku), Ph.D. Bioengineering, Spring 2015
 - Scott Thourson (advisor Prof. Christine Payne), Ph.D. Bioengineering (in progress)
 - A. Ozan Bicen (advisor Prof. Ian Akyildiz), Ph.D. Electrical and Computer Engineering (in progress)

Contributions to GWW School of Mechanical Engineering

- Member, Undergraduate education committee 2008-2009
- Member, Instructional laboratory committee 2009-present
- Member of Director of Design Search committee 2009, 2012
- Member of Mechanical Specialist (Invention studio) Search committee 2010
- Member of Burdell Initiative for Design planning committee 2009-present
- Keynote speaker: Pi Tau Sigma-Mechanical Engineering Honor Society, Annual New Member Initiation Dinner, Apr, 22, 2011; Nov 29, 2012, Nov 23, 2015
- Member, Faculty advisory committee, 2013-2015
- Member, Ad-hoc design & fabrication studio committee, 2013-present

C. Other Contributions

Consulting/Advisory Boards

- Consultant, Polymicro Technologies, LLC, Phoenix AZ. 2006-2007.
- Advisory Board Member. Clarendon Media, LLC, Atlanta GA. 2009-present
- Advisory Board Member, Zydx LLC, San Francisco, 2010
- Consultant, Bondurant Mixson & Elmore LLP, Atlanta, GA, 2011
- Scientific Advisor, Neuromatic Devices, Atlanta, GA, 2013-present
- Consultant, Cadillac Jack, Atlanta, GA, 2013-present
- Founded Atlanta Machine Design LLC, Serving as Principal Consultant, Atlanta, GA 2013-present
- Consultant, VentureWell, Hadley, MA, 2014-present

Civic Activities

- Bikes not Bombs (2004-2006): Volunteered bi-weekly for four months to prepare donated bicycles for shipment to third world countries and organize part storage, Boston, MA
- Boston Cares (2003-2005): Math tutor and volunteer at community events
- Science Club for Girls/Boys (2006-2007): Mentoring and teaching 5th grade boys weekly about science and engineering at Fletcher Maynard Academy. Curriculum includes design concepts, problem solving, teamwork, fabrication skills, and career guidance, Boston, MA

- Team in Training half-ironman endurance event participant and fundraiser for The Leukemia and Lymphoma Society (LLS), largest voluntary health agency for blood cancer (2011), Atlanta, GA
- Puget Sound Theatre Organ Society (2014): Volunteer organ technician for the maintenance and repair of a 1927 Wurlitzer 4/20 Publix 1 opus #1819 organ at the Paramount Theatre, Seattle, WA
- Peachtree Road Race volunteer organizer, July 4, 2013; July 4, 2015

VI. GRANTS AND CONTRACTS

A. As Principal and Co-Principal Investigator

Funded Proposals

<u>Role</u>	<u>Title</u>	<u>Funding Organization</u>	<u>Funding</u>	<u>Date</u>
Co-PI	Arrayed, independent, reverse-transcription PCR by infrared radiation for sensitive detection of viruses (Co-PI Sue Tong (CDC))	CDC/Georgia Tech joint program seed grant	\$99,990 (50,000 Forest)	7/09-7-11
PI	Gashopper Underpinnings Design	Georgia Economic Development Association	\$10,000	8/09-5/10
PI	Low-volume, rapid, point-of-care instrumentation for anti-platelet therapy optimization (10GRNT44300290)	American Heart Association	\$165,000	8/10-8/12
PI	The InVenture Prize: An undergraduate invention competition at Georgia Tech	NCHIA	\$43,000	5/11-5/13
Co-PI	NetSE: Large: MONACO: Fundamentals of Molecular Nano-Communication Networks (PI Ian Akyildiz) (CISE 1110947)	NSF	\$3,000,000 (\$421,920 Forest)	7/11-7/15
PI	Point-of-care instrumentation to optimize anti-platelet therapy	Wallace H. Coulter Translational/Clinical Research Grant Program	\$100,000	11/11-11/12
PI	The InVenture Prize K-12 Outreach	Fitzgerald Foundation	\$30,000	8/12-8/13
PI	Mekong Green Tech: Commercializing biomass gasification in rural Vietnam	NCHIA	\$18,500	9/12-9/13
PI	A Sixty Minute Rapid Polymerase Chain Reaction Handheld (SMRPH) for Virus Detection in Children	Georgia Tech TRIBES and Georgia Tech Research Institute (GTRI)	\$36,500	7/12-7/13
PI	High-throughput robotic analysis of integrated neuronal phenotypes (R01EY023173)	NIH, R01	\$4,284,594 (\$900,000 Forest)	9/12-9/17

Co-PI	Robotic intracellular measurement of neural network dynamics in the living brain (Co-PI Garrett Stanley)	Georgia Tech Fund for Innovation in Research and Education	\$40,000	7/13-7/14
Co-PI	IUSE - University Maker Spaces: Discovery, Optimization, and Measurement of Impacts (DUE 1432107) (PI Julie Linsey)	NSF - DUE	\$427,764 (\$25,000 Forest)	8/14-8/18
PI	A custom microchip amplifier for patch clamp electrophysiology recording (5R44NS083108-03 (PI Reid Harrison)	NIH, NINDS, SBIR	\$1,000,000 (\$90,000 Forest subcontract)	8/14-8/17
Co-PI	Robotic intracellular measurement of neural network dynamics in the living brain (1U01MH106027-01) (Co-PI Garrett Stanley)	NIH, U01	\$1,500,000 (\$750,000 Forest)	8/14-8/17
PI	Allen Institute-Georgia Tech joint faculty agreement	Allen Institute for Brain Science	\$200,000	5/14-12/14
PI	Large-scale connectivity and function in a cortical circuit	Allen Institute for Brain Science	\$150,000	1/15-11/16
PI	A device to clean patch pipettes, enabling high throughput ion channel drug screening	Georgia Tech Neural Engineering Center	\$10,000	4/15-8/15
Co-PI	Elucidating the role of copper in the mammalian nervous system (Co-PI Christoph Fahrni)	Petit Institute Interdisciplinary Seed Grant Program	\$100,000	7/15-7/17
PI	Working group on academic maker spaces (AMS)	VentureWell	\$10,000	7/15-8/15
Co-PI	Building Efficiency Technologies by Tomorrow's Engineers and Researchers (BETTER) Capstone (PI Shannon Yee)	DoE	\$200,000 (100% for student support)	6/15-6/17
PI	RENEWAL: A device to clean patch pipettes, enabling high throughput ion channel drug screening	Georgia Tech Neural Engineering Center	\$10,000	11/15-6/16

PI	High-throughput brain tissue handling for neural circuit reconstruction	Allen Institute for Brain Science	\$110,000	6/16-6/17
----	-------------------------------------------------------------------------	-----------------------------------	-----------	-----------

Funded Gifts

<u>Role</u>	<u>In support of</u>	<u>Funding Organization</u>	<u>Funding</u>	<u>Date</u>
PI	Neuroengineering research	Neuromatic Devices	\$10,000	5/12

Pending Proposals

<u>Role</u>	<u>Title</u>	<u>Funding Organization</u>	<u>Funding</u>	<u>Date</u>
PI	Scalable Cell- and Circuit- Targeted Electrophysiology	NIH, R01	\$2,660,974 (\$1,299,614 Forest)	7/17-7/21
Co-I	Monovalent copper in neuronal signaling (PI Christoph Fahrni)	NIH, R21	\$428,171 (\$228,171 Forest)	7/17-7/21
Co-PI	Reusable patch clamp chips for high throughput drug screening	Coulter Translational Partnership	\$200,000	7/17-7/18

B. As Investigator

Funded Proposals

<u>Role</u>	<u>Title</u>	<u>Funding Organization</u>	<u>Level of Funding</u>	<u>Date</u>
Co-Investigator	IGERT: Stem Cell Biomanufacturing (PI's Bob Nerem and Todd McDevitt (Georgia Tech)) (EHR 0965945)	NSF	\$3,000,000 (\$90,696 Forest)	8/10-8/15

Co- Invest- igator	From Cells to Systems: Computational Neuroscience Training at Emory & Georgia Tech (PI Dieter Jaeger (Emory)) (DA032466-02)	NIH, R90/T90	(\$102,375 Forest)	9/12-9/17
--------------------------	-----------------------------------------------------------------------------------------------------------------------------------------	--------------	--------------------	-----------

VII. HONORS AND AWARDS

- Woodruff Faculty Fellow Award (2015-2020)
- Paul A. Duke GIFT Action Plan Achievement Mentor Award (2013)
- Georgia Tech Class of 1940 W. Roane Beard Outstanding Teacher Award (2013)
- Georgia Tech Class of 1934 Outstanding Innovative Use of Education Technology Award (with co-awardees Prof. Thad Starner and Clint Zeagler) (2013)
- Engineer of the Year in Education for the state of Georgia (2013)
- Lockheed-Martin Dean's Excellence in Teaching Award (2012)
- Georgia Tech Research Corporation Undergraduate Innovation Impact Award (2011)
- Georgia Tech Institute for BioEngineering and BioSciences Junior Faculty Award (2010)
- Young Scientist Award at 20th International Symposium on Microscale Bioseparations (2006)
- Teaching Fellowship awarded by MIT Computational and Systems Biology Initiative (CSBi) (2005)
- Sandia National Laboratories MEMS Campus Fellowship (2003-2006)
- National Science Foundation (NSF) Graduate Research Fellowship (2002-2004)
- R.V. Jones Memorial Scholarship for best student paper at the annual meeting of the American Society for Precision Engineering (2003)
- Sandia National Laboratories MESA Institute Fellow (2003)
- MIT Manufacturing Course Race-car Competition Winner (2002)
- NASA Invention Award (2001)
- Georgia Tech Presidential Fellowship (2001)
- MIT Presidential Fellowship (2001)
- Science Applications International Corporation (SAIC) Student Paper Competition Award (2001)
- Georgia Tech Woodruff School of Mechanical Engineering Chair's Award (2001)
- American Society of Mechanical Engineers (ASME) President's Award (2001)
- Georgia Tech Engineering Student of the Year (2000)
- NASA Co-op (work-study) Achievement Award (1999)
- and last but not least: Burger King Employee of the Month, Misawa, Japan (Feb 1993)