

Craig R. Forest
Professor
2019

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Craig R. Forest
Associate Professor
The George W. Woodruff School of Mechanical Engineering
May 2018

I. EARNED DEGREES

| Degree | Year | University | Field |
|--|-------------|---------------------------------------|------------------------|
| Doctor of Philosophy (Advisor: Prof. Ian Hunter) | 2007 | Massachusetts Institute of Technology | Mechanical Engineering |
| Master of Science (Advisors: Prof. Alex Slocum, Dr. Mark Schattenburg) | 2003 | Massachusetts Institute of Technology | Mechanical Engineering |
| Bachelor of Science | 2001 | Georgia Institute of Technology | Mechanical Engineering |

II. EMPLOYMENT HISTORY

| 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 (Advisor: Prof. George Church) | 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. HONORS AND AWARDS

A. INTERNATIONAL OR NATIONAL AWARDS

1. Engineer of the Year in Education for the state of Georgia (2013)
2. Young Scientist Award at 20th International Symposium on Microscale Bioseparations (2006)
3. Sandia National Laboratories MEMS Campus Fellowship (2003-2006)
4. National Science Foundation (NSF) Graduate Research Fellowship (2002-2004)
5. R.V. Jones Memorial Scholarship for best student paper at the annual meeting of the American Society for Precision Engineering (2003)
6. Sandia National Laboratories MESA Institute Fellow (2003)
7. NASA Invention Award (2001)
8. Science Applications International Corporation (SAIC) Student Paper Competition Award (2001)

9. NASA Co-op (work-study) Achievement Award (1999)

B. INSTITUTE OR SCHOOL AWARDS

1. Institute Curriculum Innovation Award, Georgia Tech Center for Teaching and Learning (2019)
2. Georgia Tech Biomedical Engineering Outstanding Graduate Student Advisor Award (2017)
3. Woodruff Faculty Fellow Award (2015-2020)
4. Paul A. Duke GIFT Action Plan Achievement Mentor Award (2013)
5. Georgia Tech Class of 1940 W. Roane Beard Outstanding Teacher Award (2013)
6. Georgia Tech Class of 1934 Outstanding Innovative Use of Education Technology Award (with co-awardees Prof. Thad Starner and Clint Zeagler) (2013)
7. Lockheed-Martin Dean's Excellence in Teaching Award (2012)
8. Georgia Tech Research Corporation Undergraduate Innovation Impact Award (2011)
9. Georgia Tech Institute for BioEngineering and BioSciences Junior Faculty Award (2010)
10. Teaching Fellowship awarded by MIT Computational and Systems Biology Initiative (CSBi) (2005)
11. MIT Manufacturing Course Race-car Competition Winner (2002)
12. Georgia Tech Presidential Fellowship (2001)
13. MIT Presidential Fellowship (2001)
14. Georgia Tech Woodruff School of Mechanical Engineering Chair's Award (2001)
15. American Society of Mechanical Engineers (ASME) President's Award (2001)
16. Georgia Tech Engineering Student of the Year (2000)

IV. RESEARCH, SCHOLARSHIP, AND CREATIVE ACTIVITIES (* denotes publication prior to Georgia Tech; boldface denotes student co-authors)

A. PUBLISHED BOOKS, BOOK CHAPTERS, AND EDITED VOLUMES

A1. BOOKS - None

A2. REFEREED BOOK CHAPTERS - None

A3. EDITED VOLUMES - None

B. REFEREED PUBLICATIONS AND SUBMITTED ARTICLES

B1. PUBLISHED AND ACCEPTED JOURNAL ARTICLES

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.
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.
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.
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.
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*)

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.
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.
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.
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.
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.
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)
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.
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.
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.
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.
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. Khoury, 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*. 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)**
 34. **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*, Vol 12, p. 1-11, June 2017.
 35. L. Li, B. Ouellette, **W. Stoy**, E. Garren, T.L. Daigle, C.R. Forest, C. Koch, H. Zeng, A robot for high yield electrophysiology and morphology of single neurons in vivo, *Nature Communications*, 15604 (2017), doi:10.1038/ncomms15604
 36. **P.Y. Borden, A.D. Ortiz, C. Waiblinger, A.J. Sederberg, A.E. Morrissette**, 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, *NeuroPhotonics*, 4(3), 031212 (2017), doi: 10.1117/1.NPh.4.3.031212

37. 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*, 31 May 2017, doi: 10.1152/jn.00116.2017
38. **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, *J. Neurophysiology*, 7 June 2017, doi: 10.1152/jn.00117.2017
39. **C. Austin, D. Caro, S. Sankar, W. Penniman, J. Perdomo, L. Hu, S. Patel, X. Gu, S. Watve**, B. Hammer, C.R. Forest, Porous monolith microfluidics for bacterial cell-to-cell communication assays, *Biomicrofluidics* 11, 044110 (2017); doi: <http://dx.doi.org/10.1063/1.4995597>
40. **H.-J. Suk, I. vanWelie**, S.B. Kodandaramaiah, **B. Allen**, C.R. Forest, E.S. Boyden, Closed-loop, real-time imaging enables fully automated cell-targeted patch-clamp neural recording in vivo, *Neuron*, V. 95(5), 30 August 2017, Pages 1037-1047.e11
DOI: <https://doi.org/10.1016/j.neuron.2017.08.011> PMID: PMC5586501
41. **B. Krishnaswamy, Y. Jian, C.M. Austin, J.E. Perdomo, S.C. Patel**, B.K. Hammer, C.R. Forest, R. Sivakumar, ADMA: Amplitude-Division Multiple Access for Bacterial Communication Networks, *Institute of Electrical and Electronics Engineers (IEEE) Transactions on Molecular, Biological, and Multi-Scale Communications*, DOI: 10.1109/TMBMC.2018.2791448
42. **I. Kolb, G.T. Franzesi, M. Wang**, S.B. Kodandaramaiah, C.R. Forest, E.S. Boyden, A.C. Singer, Evidence for long-timescale patterns of synaptic inputs in CA1 of awake behaving mice, *Journal of Neuroscience* 26 December 2017, 1519-17; DOI: <https://doi.org/10.1523/JNEUROSCI.1519-17.2017>
43. 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* 2018;7:e24656 DOI: 10.7554/eLife.24656
44. **J. Lee, I. Kolb**, C.R. Forest, C.J. Rozell, Cell membrane tracking in living brain tissue using differential interference contrast microscopy, *IEEE Transactions on image processing*, 2018 Apr; 27(4):1847-1861. doi: 10.1109/TIP.2017.2787625.
45. M.T. Morgan, B. Yang, S. Harankhedkar, A. Nabatilan, D. Bourassa, A.M. McCallum, F. Sun. R. Wu, C.R. Forest, C.J. Fahrni, Stabilization of aliphatic phosphines by auxiliary phosphine sulfides offers zeptomolar affinity and unprecedented selectivity for probing biological Cu(I), *Angew. Chem.* 10.1002/ange.201804072
46. **T.J. Lee, C.F. Lewallen**, D.J. Bumbarger, P.J. Yunker, R.C. Reid, C.R. Forest. Transport and trapping of nanosheets via hydrodynamic forces and curvature-induced capillary quadrupolar interactions, *Journal of Colloid and Interface Science* (2018). DOI: 10.1016/j.jcis.2018.07.068
47. **T.J. Lee, A. Kumar, A.H. Balwani, D. Brittain, S. Kinn**, C.A. Tovey, E.L. Dyer, N.M. da Costa, R.C. Reid, C.R. Forest*, D.J. Bumbarger* (*co-corresponding authors). Large-scale neuroanatomy using LASSO: Loop-based Automated Serial Sectioning Operation, *PLOS One* 13(10): e0206172. <https://doi.org/10.1371/journal.pone.0206172> (2018)
48. I.K. Cho, **B. Yang**, C.R. Forest, L. Qian, A.W.S. Chan, Amelioration of Huntington's disease phenotype in astrocytes derived from iPSC-derived neural progenitor cells of Huntington's disease monkeys, *PLOS One* 14(3): e0214156. <https://doi.org/10.1371/journal.pone.0214156>
49. **G.L. Holst, W. Stoy, B. Yang, I. Kolb, S.B. Kodandaramaiah**, L. Li, U. Knoblich, H. Zeng, B. Haider, E.S. Boyden, C.R. Forest, Autonomous patch clamp robot for functional characterization of neurons in vivo: development and application to mouse visual cortex, *J. Neurophysiology* 121:2341-2357, 2019. <https://doi.org/10.1152/jn.00738.2018>
50. **I. Kolb, C. Landry, M. Yip, C. Lewallen, W. Stoy, J. Lee, A. Felouzis, B. Yang**, E.B. Boyden, R. Rozell, C.R. Forest, PatcherBot: a high throughput robotic single-cell electrophysiology system, *Journal of Neural Engineering* (*accepted*)

B2. CONFERENCE PRESENTATION WITH PROCEEDINGS (REFEREED)

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. Przbylowski, 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 (μTAS)*, 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.
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105. **Y.J. Liew, C.J. Whitmore, W. Stoy,** A. Pala, A.D. Ortiz, **P.Y. Borden,** B. Yang, C.R. Forest, G.B. Stanley, Quantifying sensory encoding from thalamus to cortex in topographically aligned neuron pairs, *Proceedings of the Annual Meeting of the Society for Neuroscience* (Neuroscience 2017), Washington, DC, Nov 11-15, 2017.
106. **P.Y. Borden, I. Kolb, W. Stoy,** A.D. Ortiz, A.J. Sederberg, A.E. Morrisette, C. Waiblinger, C.R. Forest, D. Jaeger, G.B. Stanley, Thalamic Control of Sensory Evoked Spatiotemporal Cortical Responses, *Proceedings of the Annual Meeting of the Society for Neuroscience* (Neuroscience 2017), Washington, DC, Nov 11-15, 2017.
107. **W.A. Stoy, I. Kolb, G.L. Holst,** U. Knoblich, C.R. Forest, Capping patch clamp pipettes for improved gigaseal yield, *Proceedings of the Annual Meeting of the Society for Neuroscience* (Neuroscience 2017), Washington, DC, Nov 11-15, 2017.
108. **J. Lee, I. Kolb,** C.R. Forest. C.J. Rozell, Cell membrane tracking in live brain tissue with differential interference contrast (DIC) microscopy, *Proceedings of the Annual Meeting of the Society for Neuroscience* (Neuroscience 2017), Washington, DC, Nov 11-15, 2017.
109. **I. Kolb, J. Lee, A. Felouzis,** W.A. Stoy, E.S. Boyden, C.J. Rozell, C.R. Forest, Image-guided automated patch-clamp electrophysiology in vitro, *Proceedings of the Annual Meeting of the Society for Neuroscience* (Neuroscience 2017), Washington, DC, Nov 11-15, 2017.
110. **T. Lee,** D. Bumbarger, R.C. Reid, C.R. Forest, Batch processing of ultrathin sections for large-scale, serial section electron microscopy, *Proceedings of the Annual Meeting of the Society for Neuroscience* (Neuroscience 2017), Washington, DC, Nov 11-15, 2017.

111. **M.E. Tomko, E. Hilton, C.R. Forest, K.G. Talley, S. Smith, R. Nagel, J. Linsey**, Observations on guiding principles, or best practices, in successful university makerspaces, *International Symposium on Academic Makerspaces (ISAM)*, Cleveland, OH, Sep 24-27, 2017.
112. **S.B. Thourson, A.H. Finlay, C. Landry, C.R. Forest**, Gold nanoparticle wires have both higher flexibility and conductivity than polymers for flexible bioelectrodes, *Society for Biomaterials Annual Meeting*, Atlanta, GA, Apr 11-14, 2018.
113. J. An, F.J. Flores, S. Kodandaramaiah, I.D. Betta, K. Nikolaeva, E. Boyden, C.R. Forest, E.N. Brown, Automated Assessment of Loss of Consciousness Using Whisker And Paw Movements During Anesthetic Dosing in Head-Fixed Rodents, *IEEE Engineering in Medicine and Biology Society (EMBS)*, Honolulu, HI, July 17-21, 2018.
114. **E. Hilton, C.R. Forest, J.S. Linsey**, Slaying Dragons: An empirical look at the impact of academic makerspaces, *International Symposium on Academic Makerspaces (ISAM)*, San Francisco, CA, Aug 3-5, 2018.
115. M. Cooke, C.R. Forest, B. Hartmann, A.M. Hoover, J. Hunt, M. Kohn, M.L. Culpepper, V. Wilczynski, Models for curricular integration of makerspaces. *International Symposium on Academic Makerspaces (ISAM)*, Stanford, CA Aug 3-5, 2018.
116. **A. Kumar, T. Lee, C.R. Forest**, Development of a robotic system for large-scale neural section processing for serial section electron microscopy, *Proceedings of the Biomedical Engineering Society (BMES) 2018*, Atlanta, GA, Oct 17-20, 2018.
117. **Y. Wu, C. Landry, W.Y. Gu, A. Felouzis, B. Yang, C.R. Forest**, Application of Method for Reuse of Patch Pipettes to Planar Patch Clamp Arrays, *Proceedings of the Biomedical Engineering Society (BMES) 2018*, Atlanta, GA, Oct 17-20, 2018. (*submitted*)
118. **C. Landry, I. Kolb, W. Stoy, M. Yip, C. Lewallen, C. Forest**, Pipette cleaning enables one hundred automated patch attempts with a single pipette, *Proceedings of the Annual Meeting of the Society for Neuroscience (Neuroscience 2018)*, San Diego, CA, Nov 3-7, 2018.
119. **T.J. Lee, E.L. Dyer, D.J. Bumbarger, R.C. Reid, C.R. Forest**, Fully automated serial sectioning using robotic and capillary interaction-based tools, *Max Planck/HHMI Connectomics Meeting*, Berlin, April 14-17, 2019.
120. **C.F. Lewallen, Q. Wan, A. Maminishkis, W. Stoy, I. Kolb, N. Hotaling, K. Bharti, C.R. Forest**, “Towards automated intracellular electrophysiology of retinal pigment epithelium,” *The Association for Research in Vision and Ophthalmology (ARVO)*, Vancouver, BC, Apr 28 – May 2, 2019.

B3. OTHER REFEREED MATERIAL – None

B4. SUBMITTED JOURNAL ARTICLES

51. C.F. Lewallen, Q. Wan, A. Maminishkis, W. Stoy, I. Kolb, N. Hotaling, K. Bharti, C.R. Forest, High-yield, automated intracellular electrophysiology of epithelium, *Journal of Neuroscience Methods (under review)*

C. OTHER PUBLICATIONS AND CREATIVE PRODUCTS

C1. PATENTS

C1.A. PATENTS AWARDED

1. *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)**
2. *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)**
3. *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)**
4. *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)**
5. *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)**
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 8,240,623, filed Sep 22, 2011 and issued Aug 14, 2012. **(Licensed to Whirlpool Corporation)**
7. **S. Kodandaramaiah**, E. Boyden, C. R. Forest, Automated cell patch clamping method and apparatus, U.S. Patent 9,498,293, filed Nov 13, 2013 and issued Nov 22, 2016.

C1.B. 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. 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.
3. **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).
4. **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, utility application 15/643,462, filed July 7, 2017. (GTRC reference no: 7379).

C1.C. PROVISIONAL PATENTS AND INVENTION DISCLOSURES

5. *C.R. Forest, I.W. Hunter, Micro-well array with integrated lenslets, Invention Disclosure filed, Sep 2008 with MIT Office of Technology Licensing.
6. 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).
7. 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.
8. **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)

9. 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.
10. K. Bharti, A. Maminishkis, **C. Lewallen**, Q. Wan, C.R. Forest, Blind, sharp microelectrode insertion method for automated electrophysiology, Invention Disclosure filed, Oct 2017 with National Institutes of Health.

C2. 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.

C3. FEATURES 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. J. Davis, Push is on to stem disinterest in math, sciences, , *Atlanta Journal-Constitution*, Apr 25, 2014.
19. 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.
20. L. Beil, Pregnancies shadowed by fears of Zika, *New York Times*, March 15, 2015.

21. H. Shen, Robots record brain activity inside neurons, *Nature*, April 1, 2016.
22. J. Toon, Robotic cleaning technique could automate neuroscience research, *EurekAlert*, October 25, 2016.
23. Marris Stephens, Patcherbot robot frees humans from laborious lab work, *Physics World*, June 13, 2009.

Physics world article on patcherbot

D. PRESENTATIONS

D1. KEYNOTE ADDRESSES AND PLENARY LECTURES

1. Keynote speaker (invited), National Instruments Leaders (NILEaders) event, Atlanta, GA, April 14, 2011
2. 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.
3. 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.
4. 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.
5. 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.
6. Keynote speaker (invited), Kavli Futures Symposium “Emerging Technologies for Neuroscience: Building the New Brain Science” Santa Barbara, CA, June 27-28, 2015

D2. INVITED CONFERENCE AND WORKSHOP, AND PANEL PRESENTATIONS

1. 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.
2. 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.
3. 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.
4. Panel host, Horizons in Neuroscience Investment and Innovation, Neurolaunch Investor Demo Day, Atlanta, GA, February 4, 2015
5. MIT alumni panel, Faculty Forum Online, Alumni Edition, Massachusetts Institute of Technology, July 24, 2015
6. Electrical and Computer Engineering Department Heads Annual Meeting: Invited attendee and speaker, Hilton Sandestin Beach, Miramar Beach Florida, Mar 17-21, 2017,
7. National Science Teachers Association (NSTA) 66th National Conference, Panel on Community Connections entitled Spare Parts: Re-Inventing Engineering Education for the 21st Century, Atlanta GA, March 15-18, 2018.

Federation of European Neuroscience Societies, Forum of Neuroscience, Session on Robotic Tools for Neuroscience. Robotic platform for multi-neuron intracellular recording in vivo. Glasgow, UK, July 11-

15, 2020.

D3. CONFERENCE, WORKSHOP, AND SYMPOSIUM PRESENTATIONS

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 Forest. 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.

33. **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 11-14, 2016.
34. A.R. Johansen, **T. Lee, C.R. Forest, D.J. Bumbarger,** Improvements in Section Handling for High Throughput Electron Microscopy, Cell Science Symposium 2016, Seattle, WA, December 12, 2016.
35. **Y. Liew, W. Stoy, C.R. Forest, G.B. Stanley,** Tools for transynaptic electrophysiology at single cell and sub-threshold resolution, BRAIN Initiative Investigators Meeting, Bethesda, MD, Apr 9-11, 2018.
36. **R.E. Perszyk, M. Yip, A. Jenkins A., S.F. Traynelis S.F., C.R. Forest,** Automation of Patch-Clamp Electrophysiology to Accelerate Pharmacological Assays. Ionotropic Glutamate Receptor Retreat, Pittsburgh, PA, July 31 - August 2, 2018.

D4. INVITED SEMINAR PRESENTATIONS

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, Automated patch clamp electrophysiology of neurons in the living brain, *National Institutes of Health*, National Eye Institute, Bethesda, MD, June 2, 2016.
29. C.R. Forest, A. Noel, T. Spencer, R.A. Moore, The possibilities enabled by student empowerment and ownership. *California Polytechnic State University*, San Luis Obispo, CA, April 7, 2017.
30. C.R. Forest, Automated single-cell analysis of neurons in the living brain, *Tsinghua University*, School of Life Sciences, Beijing, China, May 24, 2017.
31. C.R. Forest, Automated single-cell analysis of neurons in the living brain, *Peking University*, Department of Biomedical Engineering, Beijing, China, May 24, 2017.
32. C.R. Forest, Automated single-cell analysis of neurons in the living brain, *Peking University*, IDG McGovern Institute for Brain Research, Beijing, China, May 26, 2017.
33. C.R. Forest, A. Noel, T. Spencer, R.A. Moore, The possibilities enabled by student ownership of making, invention, and entrepreneurship, *University of Auckland*, Dean's Lecture Series, Auckland, New Zealand, August 29, 2017.
34. C.R. Forest, Automated single-cell analysis of neurons in the living brain, *University of Auckland*, Auckland Bioengineering Institute (ABI), Auckland, New Zealand, August 30, 2017.
35. C.R. Forest, Automated single-cell analysis of neurons in the living brain, *BRAIN Initiative Tech Integration Seminar Series*, hosted by National Institutes of Health (NIH), November 27, 2017.
36. C.R. Forest, Automated single-cell analysis of neurons in the living brain, *Medical College of Georgia*, Athens, GA, December 14, 2017.
37. C.R. Forest, The Brain science of the gaming experience, Game-On Conference, Pechanga Resort and Casino, Temecula, CA, June 5-7, 2018.

F1. START-UP COMPANIES FOUNDED OR CO-FOUNDED

- 1. Claw Hanging Systems, Atlanta GA, commercialized bicycle storage apparatus, sold >1M units worldwide, Managing Partner, 2007-2014
- 2. Neuromatic Devices, Atlanta, GA, commercialized in vivo, automated patch clamping robot, sold dozens of robots worldwide, Founder and scientific advisor, 2013-present
- 3. Atlanta Machine Design, Atlanta, GA, consulting and engineering services, Principal Consultant, 2013-present

E. SOCIETAL AND POLICY IMPACTS

G1. EXPERT WITNESS ROLES

- 1. Case: NuSep v. Expedeon, Thermo Fisher Scientific, and Pierce Biotechnology, Bondurant Mixon & Elmore LLP, lawyer Christopher Giovinazzo, 2011
- 2. Martzell Bickford and Centrola, lawyer Neil Nazareth, personal injury lawsuit, Aug-Dec 2016 (through Consulting Alliance LLC)
- 3. Alston and Bird, LLB, Rothschild Connected Devices Innovations, LLC v. The Coca-Cola Company, Project #045879, 2017 (through Consulting Alliance LLC)
- 4. Case 1:18-cv-00284-WCG, United States District Court, Eastern District of Wisconsin, Green Bay Division; Pierce Manufacturing Inc. v. Rev Group, Inc and E-One, Inc. Feb-Apr 2018, hired by Cozen O’Conner, lawyer Samuel Lewis

F. OTHER PROFESSIONAL ACTIVITIES

- 1. Consultant, Polymicro Technologies, LLC, Phoenix AZ. 2006-2007.
- 2. Advisory Board Member. Clarendon Media, LLC, Atlanta GA. 2009-present
- 3. Advisory Board Member, Zydx LLC, San Francisco, 2010
- 4. Consultant, Cadillac Jack, Atlanta, GA, 2013-present
- 5. Consultant, VentureWell, Hadley, MA, 2014-present

V. EDUCATION

A. COURSES TAUGHT

| Semester, Year | Course Number | Course Title | Number of Students |
|-----------------------|----------------------|-------------------------------|---------------------------|
| Fall, 2018 | ME 4182 | Capstone Design | ~40 |
| Fall 2018 | XX 2699, XX 4699 | Idea to Prototype | ~100 |
| Summer 2018 | XX 2699, XX 4699 | Idea to Prototype | 21 |
| Spring 2018 | XX 2699, XX 4699 | Idea to Prototype | 83 |
| Fall 2017 | XX 2699, XX 4699 | Idea to Prototype | 61 |
| Summer 2017 | XX 2699, XX 4699 | Idea to Prototype | 13 |
| Spring 2017 | XX 2699, XX 4699 | Idea to Prototype | 67 |
| Fall 2016 | XX 2699, XX 4699 | Idea to Prototype | 49 |
| Spring 2016 | XX 2699, XX 4699 | Idea to Prototype | 59 |
| Fall 2015 | XX 2699, XX 4699 | Idea to Prototype | 48 |
| Fall 2015 | ME 2110 | Creative Decisions and Design | 20 |
| Spring 2015 | ME 2110 (2 sections) | Creative Decisions and Design | 37 |
| Spring 2014 | GT 4823 (2 sections) | Capstone Design | 59 |

| | | | |
|-------------|----------------------|-----------------|-----|
| Fall 2013 | ME 4182 | Capstone Design | 29 |
| Spring 2013 | ME 8803 | Applied Optics | 9 |
| Fall 2012 | ME 4182 | Capstone Design | 5 |
| Spring 2012 | ME 4182 (7 sections) | Capstone Design | 166 |

B. INDIVIDUAL STUDENT GUIDANCE

B1. Ph.D. STUDENTS

B1.A. GRADUATED

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”
 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
 Current position: Senior Narrative Writer, Riot Games, since 2015
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
 Current position: Research Scientist, Sandia National Laboratories, since January 2015
4. Holst, Greg
 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
 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
 Current position: Research engineer, Becton, Dickinson (BD) and Company, since Jan 2017

6. Kolb, Ilya
 Began Advising: Spring 2013, BME
 Graduated: Fall 2017, BioE
 Dissertation: Walk-away automation of in-vitro patch-clamp electrophysiology
 Qualifying exams passed May 2013
 Current position: Data, Innovation, and Process Engineer, Janelia Research Campus

7. Thourson, Scott
 Began Co-advising: Fall 2013, BME (Co-advised with Prof. Christine Payne)
 Graduated: Spring 2017, BioE
 Dissertation: Conductive Polymer Microwires for Single Cell Bioelectrical Stimulation
 Qualifying exams passed May 2015
 Current position: Post-doc at University of Florida

8. Stoy, William
 Began Advising: Fall 2012, BME
 Dissertation: Automated single-cell electroporation and subcortical whole-cell recording in vivo
 Qualifying exams passed May 2013
 Fellowship: **National Science Foundation (NSF) Graduate Research Fellowship**, 8/13-8/16
 Current position: Post-doc at Columbia University (Yuste Lab)

B1.B. IN PROCESS

1. Lee, Timothy
 Began Advising: Fall 2014, ME
 Project Title: High-throughput brain mapping
 Qualifying exams passed December 2015
 Award: **Nerem Interational Travel Grant**, 2019
 Current Position: Post-doc at CAESAR (Center for Advanced European Studies and Research),
 Bonn, Germany (Briggman Lab)

2. Landry, Corey
 Began Advising: Fall 2015, BME
 Dissertation: Sensing and modulating gene expression in neurons
 Qualifying exams passed May 2016
 Fellowship: **National Science Foundation (NSF) Graduate Research Fellowship**, 8/15-8/18

3. Lewallen, Colby
 Began Advising: Fall 2016, ME
 Dissertation: Transmembrane potential measurement of retinal pigment epithelium
 Qualifying exams passed March 2018

4. Yip, Mighten
 Began Advising: Fall 2017, ME
 Dissertation: Optically guided neural circuit recording in vivo
 Qualifying exams passed May 2018

B2. M.S. STUDENTS

B2.A. GRADUATED WITH M.S.

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)
Current position: PhD student MIT, Aug 2012-May 2018
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)
Current position: unknown

B2.B. IN PROCESS WITH M.S. – None

B3. UNDERGRADUATE STUDENTS (SPECIAL PROBLEMS AND RESEARCH STUDENTS)

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 Insitute 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-May 2015, 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 2013
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-May 2017, 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-December 2016, 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-Dec 2017, winner **PURA undergraduate research award** (Fall 2017)
68. Amanda Felouzis, Undergraduate research assistant, Georgia Tech, Biomedical Engineering, Aug 2016-Dec 2017, winner **PURA undergraduate research award** (Summer 2017), **Conference travel PURA award** (Fall 2017)
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-Dec 2017
76. Aditi Kumar, Undergraduate research assistant, Georgia Tech, Mechanical Engineering, Jan 2017-present, winner **PURA undergraduate research award** (Spring 2018)
77. Elizabeth O’Gorman, Undergraduate research assistant, Emory University, Neuroscience and Behavioral Biology, May 2017-Aug 2017, **Georgia Tech Summer Undergraduate Research in Engineering (SURE) program** (Summer 2017)
78. Daughtry St. John, Undergraduate research assistant, Georgia Tech, Neuroscience, Nov 2017-May 2018
79. Elaine Wu, Undergraduate research student, University of Georgia, Bioengineering, Jun 2018-Aug 2018
80. Wenyu Gu, Visiting undergraduate research assistant, Biomedical Engineering, Peking University, July 2018
81. Yasmine Bassil, Undergraduate research assistant, Georgia Tech, Mechanical Engineering, Jan 2019-present

B4. SERVICE ON THESIS OR DISSERTATION COMMITTEES

B4.A. INTERNAL

1. Jamie Huffman (advisor Prof. Brandon Dixon), M.S.M.E, Fall 2011

2. Massimiliano Pierobon (advisor Prof. Ian Akyildiz), Ph.D. Electrical and Computer Engineering, Summer 2013
3. Lauren Casa (advisor Prof. David Ku), Ph.D. Bioengineering, Spring 2015
4. A. Ozan Bicen (advisor Prof. Ian Akyildiz), Ph.D. Electrical and Computer Engineering Spring 2016
5. Aaron Enten (advisor Prof. Todd Sulchek), Ph.D. Bioengineering, Spring 2019
6. Ethan Hilton (advisor Prof. Julie Linsey), Ph.D. Mechanical Engineering, Spring 2019
7. John ZhangYi Lee (advisor Prof. Chris Rozell), Ph.D. Electrical and Computer Engineering, Summer 2019
8. Thomas Spencer (advisor Prof. David Hu), Ph.D. Mechanical Engineering, in progress

B4.A. EXTERNAL - None

B5. MENTORSHIP OF POSTDOCTORAL FELLOWS, VISITING SCHOLARS, RESEARCH ENGINEERS, AND RESEARCH SCIENTISTS

B5.A. POSTDOCTORAL FELLOWS, RESEARCH ENGINEERS, AND RESEARCH SCIENTISTS

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, B.S. in Mechanical Engineering
Jan 2012-Aug 2012
Project Title: Microfluidic device fabrication and testing
3. Hotaling, Nathan, Ph.D
Research Engineer, Ph.D in Biomedical Engineering
Aug 2013-Dec 2013
Project Title: High-throughput in-vivo electrophysiology
4. Yang, Bo, Ph.D
Research Scientist, PhD in Neuroscience
Jan 2014-present
Project Title: High-throughput in-vivo electrophysiology
5. Knight, Ali
Research Engineer, BS in Biomedical Engineering
Jan 2018-Aug 2018
Project Title: Patch clamping instrumentation
6. Perszyk, Riley
Post-doctoral researcher, PhD in Neuroscience
April 2018-present
Project Title: Robotic pharmacology

B5.B. VISITING SCHOLARS AND VISITING GRADUATE STUDENTS

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
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
 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
 6. Wang, Yunmiao (rotation for Emory University Neuroscience PhD program)
March 2017-Jun 2017
Project Title: Automated in-vitro patch clamping in brain organoids

C. EDUCATIONAL INNOVATIONS AND OTHER CONTRIBUTIONS

C1. INSTITUTE-WIDE

1. 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 and instrumentally involved with expansion to K-12 (InVenture Challenge) with 4000+ K-12 students competing each year in Georgia, as well as expansion to 15 Atlantic Coast Conference Universities (ACC InVenture Prize) with 4000 collegiate student competitors in 2016 and live television broadcast available in tens of millions of American homes in 10 states on public broadcasting affiliate stations.

2. Maker movement: Invention Studio, CREATE-X, and HEMI (2009-present)

According to the National Academy of Engineering, “21st century engineering education must adapt to encourage creativity, innovation, and flexibility for it and its graduates to remain globally competitive.” Over the past 10 years, Dr. Forest has been a leader in transforming the engineering student experience within and outside of Georgia Tech to be more hands-on, team-focused, open-ended, creative and inventive through three foundational programs: Invention Studio, HEMI, and CREATE-X, through which he has nurtured *entrepreneurial confidence* as one of the signature attributes of Georgia Tech graduates.

Dr. Forest founded the Invention Studio to empower students to invent and physically make their own ideas. In the Invention Studio, a group of 120 student volunteers “own” and operate a \$1M machine shop for 2000+ students/month working on course, research, or personal projects. Beyond Georgia Tech, Dr. Forest has been invited to speak at the White House to the leaders of Historically Black Colleges and Universities on Sep. 17, 2014. He was invited to the inaugural White House Maker Faire with President Obama (June 18, 2014), and Dr. Forest gave a keynote seminar at the Smithsonian National Museum of American History (Mar. 23, 2013). He served as a consultant and keynote speaker at the NSF Epicenter Pathways to Innovation Project for 12 universities engaged in transformational innovation and entrepreneurship programs. Many universities have started their own versions of the Invention Studio with his assistance, including MIT, Vanderbilt, U. Nebraska, U. Toledo, U. Auckland, and numerous articles in popular press have been published including the *AJC*, *TechCrunch*, *Hackaday*, *MAKE Magazine*, *Fox News*, and *PRISM Magazine*. Dr. Forest has disseminated this work in journals (Forest, Moore et al, 2014, Weinmann et al, 2015) and conferences (Levy et al, 2015, Forest, 2014), has been awarded funding to study its impacts (NSF, PI’s Linsey and Forest), has given invited international seminars (e.g., U. Auckland, 2017) and won numerous awards for this scholarly achievement.

Dr. Forest is a co-founding member of the Higher Education Makerspace Initiative (HEMI), a non-profit consortium that nationally promotes the best practices and impacts of academic makerspaces, consisting of one representative from each of MIT, Yale, Stanford, Berkeley, Olin College, Case Western Reserve University, and Georgia Tech. Through HEMI, led by Prof. Culpepper (MIT), Dr. Forest has been a part of designing and offering 4 workshops to more than 100 attendees from around the world, as well as co-founding and co-organizing the International Symposium on Academic Makerspaces (ISAM) conference, which over 1000 people have attended.

3. Capstone Design, ME 4182/GT 4823: Aug 2008-May 2014,

Dr. Forest has 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 (GT 4823) starting Spring 2014, and for start-up focused teams in Fall 2018
- 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
4. 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.
 5. CREATE-X: Dr. Forest is a founding member and associate director of Georgia Tech’s CREATE-X program. CREATE-X, led by Prof. Sivakumar, has become a flagship entrepreneurship program, impacting 1600 students in 3 years. In CREATE-X, Dr. Forest directs Idea-to-Prototype (I2P), which offers students course credit, mentorship, and funding to advance their ideas for a value-creating product by performing basic research, analysis, building, and testing—towards a prototype. Over the past 3 years (Fall 2015, Spring 2016, Fall 2016, Spring 2017, Summer 2017, Fall 2017, Spring 2018, Summer 2018), 119 teams have participated in this course. He will offer a new CREATE-X course for Capstone Design (Fall 2018)—more than 100 students have already applied for its 30 spots.
 6. Faculty Associate in Grand Challenges Living Learning Community (GCLLC), a 110 freshmen dormitory community, 2012-2013
 7. Collaborated with Judith Norback, Oral Communication Excellence for Engineers and Scientists, Morgan and Claypool, August 2013.

VI. SERVICE

A. PROFESSIONAL CONTRIBUTIONS

A1. EDITORIAL BOARD MEMBERSHIPS

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

A2. SOCIETY OFFICES, ACTIVITIES, AND MEMBERSHIP

1. Founding member and co-organizer, Higher Education Makerspace Initiative (HEMI), International Symposium on Higher Education Makerspaces (ISAM), 2013-present
2. Member, American Society of Mechanical Engineering (ASME)
3. Member, American Society for Precision Engineering (ASPE)
4. Member, California Separation Science Society (CASSS)
5. Member, Biomedical Engineering Society (BMES)
6. Member, Society for Neuroscience (SfN)
7. Member, New York Academy of Sciences (NYAS)
8. Member, American Society for Engineering Education (ASEE)

A3. ORGANIZATION AND CHAIRMANSHIP OF TECHNICAL SESSIONS, WORKSHOPS AND CONFERENCES

1. 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
2. Capstone Design Conference
 - 2012 Panelist
 - 2014 Annual meeting organizing committee member
 - 2014 Panelist
3. International 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
4. 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
5. American Society of Mechanical Engineering (ASME)
 - 2012 ASME iShow steering committee member
6. ACM/IEEE International Conference on Nanoscale Computing and Communication (NanoCom)
 - 2013 Member of ACM NanoCom 2014 Technical Program Committee Atlanta GA, May 6-9, 2014 (inaugural meeting),
7. Higher Education Makerspace Initiative (HEMI) and International Symposium on Academic Makerspaces (ISAM)
 - Founding member and co-organizer, Higher Education Makerspace Initiative (HEMI), International Symposium on Higher Education Makerspaces (ISAM), 2013-present
 - 2016 Workshop co-organizer and co-host/instructor (with Prof. Martin Culpepper, MIT) Makerspaces 101, Venturewell, Portland, OR, March 6, 2016
 - 2016 Professional Education co-organizer and co-host/instructor, Making Makerspaces, MIT, Cambridge, MA, Mar 20-22, 2016
 - 2017 Workshop coordinator, PCB Router Workshop; Conference manuscript reviewer
 - 2018 Professional Education co-organizer and co-host/instructor, Making Makerspaces, Georgia Tech, Atlanta, GA, Feb 12-14, 2018
 - 2019 Lead host and organizer, ISAM 2019

A4. TECHNICAL JOURNAL OR CONFERENCE REFEREE ACTIVITIES

1. Nature Protocols
2. International Society of Academic Makerspaces
3. Optical Engineering
4. Precision Engineering
5. Chromatography A
6. Electrophoresis
7. ASME Journal of Mechanical Design
8. Sensors & Actuators: A. Physical
9. Sensors & Actuators: B. Chemical
10. Lab on a Chip
11. IEEE Transactions on Biomedical Circuits and Systems
12. Journal of The Electrochemical Society
13. Capstone Conference
14. Biomedical Engineering Society (BMES)
15. Nanoletters
16. Advances in Engineering Education (ASEE)
17. Journal of Micromechanics and Microengineering
18. PloS One
19. Review of Scientific Instruments

A5. PROPOSAL PANELS AND REVIEWS

1. National Science Foundation, CBET panel, Biomedical Engineering division, Jun 2010, Oct 2010
2. National Collegiate Inventors and Innovators Alliance (NCIIA), VentureWell, June 2011, Jan 2012, Jan 2015
3. American Heart Association, Apr 2012, Oct 2012
4. 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; NIMH BRAIN Initiative Feb 2017; NIH BNVT BRAIN Initiative Oct 2018
5. University of California Davis Grand Challenge Initiative in Brain Science (BRAIN-STIM), Feb 2015

A6. OTHER INVOLVEMENT - None

B. PUBLIC AND COMMUNITY SERVICE

1. 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
2. Boston Cares (2003-2005): Math tutor and volunteer at community events
3. 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
4. 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
5. 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
6. Peachtree Road Race volunteer organizer, July 4, 2013; July 4, 2015

C. INSTITUTE CONTRIBUTIONS

C1. INSTITUTE COMMITTEE SERVICE

1. Judge for the “Ramblin’ Wreck” Parade, Homecoming 2009
2. Served on Institute-wide Neuro@GT task force charged with outlining a vision and strategy for neuroengineering and neuroscience at Georgia Tech, 2014
3. Dinner Jackets Host and Co-Host, Student Alumni Association dinner program for groups of 8-10 undergraduates, 2014-2015
4. Member, Office of the Provost Commission on Creating the Next in Education, 2016-2018
5. Member, Institute Undergraduate Curriculum Committee representing the College of Engineering, 2017-2020

C2. COLLEGE COMMITTEE SERVICE –

1. College Non-Tenure Track (NTT) Promotion/Review Committee 2019-2021

C3. SCHOOL COMMITTEE SERVICE

1. Member of Qualifying Exam Committees, ME, BioE, BME, 2008-present
2. Member, Undergraduate education committee 2008-2009
3. Member, Instructional laboratory committee 2009-present
4. Member of Director of Design search committee 2009, 2012
5. Member of Mechanical Specialist (Invention studio) search committee 2010
6. Member of Burdell Initiative for Design planning committee 2009-2011
7. Keynote speaker: Pi Tau Sigma-Mechanical Engineering Honor Society, Annual New Member Initiation Dinner, Apr, 22, 2011; Nov 29, 2012, Nov 23, 2015
8. Member, Faculty advisory committee, 2013-2015
9. Member, Ad-hoc design & fabrication studio committee, 2013-2018
10. Chair, First Level (Area) Committee for critical review for Assistant Prof. Levi Wood, 2017
11. Member, Communications Director search committee, 2018
12. Member, GWW Strategic Planning committee, 2018-19

C4. PROGRAM DEVELOPMENT: RESEARCH

1. Institute for Bioengineering and Biosciences (IBB) Neuroscience Workshop co-organizer, 2013
2. Neural Engineering Center Executive Committee member. The Neural Engineering Center is a Georgia Tech Interdisciplinary Research Center, 2015-present
3. 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

C5. PROGRAM DEVELOPMENT: ACADEMIC

1. Guest Lecturer
 - b. ME 3141, “Cutting Edge Technologies”, Feb 11, 2010
 - c. GT1000, Innovation and Entrepreneurship: Georgia Tech culture, opportunities, and YOU. Oct 12, 2010
 - d. ME 6229, “Introduction to MEMS”, Sep 7, 2011
 - e. BMED 4400: NeuroEngineering Fundamentals, Feb 20, 2012, Feb 18, 2013
 - f. ME 7757, “Teaching Practicum”, Sep 13, 2012, Sep 12, 2013
 - g. NEUR 3010, “Neuroscience Methods”, April 11, 2019

C6. OTHER INSTITUTE SERVICE CONTRIBUTIONS

1. Reviewer for many grant mechanisms such as
 - a. Georgia Tech Fund for Innovation in Research and Education (GT-FIRE) grant program, Feb 2012, 2015
 - b. Georgia Tech Regenerative Engineering and Medicine (REM) Center Innovative Research Grants, Aug 2012
 - c. Children's Healthcare of Atlanta and Georgia Tech Center for Pediatric Innovation seed grant program, May 2013
 - d. Petit Institute Seed Grant 2017
 - e. IEN Seed Grant 2017

IV. E5. PROPOSALS SUBMITTED BUT NOT FUNDED (LAST TWO YEARS)

| <u>Role</u> | <u>Title</u> | <u>Funding Organization</u> | <u>Funding</u> | <u>Date</u> |
|-------------|---|-----------------------------------|-------------------------------------|-------------|
| Co-PI | Reusable patch clamp chips for high throughput drug screening | Coulter Translational Partnership | \$200,000 | 7/17-7/18 |
| Co-I | Monovalent copper in neuronal signaling (PI Christoph Fahrni) | NIH, R21 | \$428,171 (\$228,171 Forest) | 7/17-7/21 |
| PI | Non rigid microelectrode insertion into brain tissue | Kernel | \$400,000 | 7/17-7/19 |
| PI | Conducting polymer wires for modulation of single neurons in vivo | NIH, R21 | \$423,772 (223,772 Forest) | 9/17-9/19 |
| PI | Development of tools for automated, high-throughput, proteomic and connectomic neuroanatomy (Recipient: graduate student Timothy Lee) | NIH, F31 | \$224,931 | 7/17-7/20 |
| PI | Intracellular measurement of cell and circuit development in multi-lineage brain organoids | NIH, R01 | \$3,497,092 (\$1,153,915 Forest) | 8/19-8/24 |
| Co-PI | Collaborative Research: Physiology of precise acousto-membrane potential modulation | NSF | \$401,409 (\$153,865 Forest) | 9/19-9/22 |
| Co-PI | Airborne pathogen detection device | Dod JPEO | \$212,000 | 5/19-3/20 |