

Gregory Timp

Curriculum Vitae

316 Stinson-Remick Hall,

Notre Dame, IN 46556

Phone: (574) 631-1272

Email: gtimp@nd.edu

Education:

University of Illinois at Urbana-Champaign, *Highest Honors*

Electrical Engineering, B.S.

Massachusetts Institute of Technology, *Bell Laboratories Research Fellow*,

Electrical Engineering, M.S.

Massachusetts Institute of Technology,

Electrical Engineering, Ph.D.,

IBM, T.J. Watson Research Center, Postdoctoral Fellow,

Employment:

2020- Present: H. Clifford and Evelyn A. Brosey Chair of Engineering

2010-Present: Professor of Electrical Engineering & Biological Sciences, University of Notre Dame

Affiliate: Harper Cancer Research Institute, South Bend, IN

2000-2010: Professor, Department of Electrical and Computer Engineering,

University of Illinois at Urbana-Champaign, Illinois

Professor, Biophysical Department Professor,

Institute for Genomic Biology

Professor, Beckman Institute for Advance Science and Technology

1986-2000: Member of the Technical Staff, Bell Laboratories, Murray Hill, NJ

1984-1986: Post-doctoral Fellow, IBM T.J. Watson Research Center, Yorktown Heights, New York

Honors and Affiliations:

- **Fellow**, American Association for the Advancement of Science
- **Fellow**, American Physical Society
- **Fellow**, Institute of Electrical and Electronic Engineers
- Member, American Biophysical Society
- Member, American Chemical Society
- Member, Electrochemical Society

Selected (from >200) Publications (reverse chronological order):

1. Timp W, **Timp G**. Beyond Mass Spectrometry, the Next Step in Proteomics. *Science Advances*, **6**(2), eaax8978 (2020). doi: 10.1126/sciadv.aax8978
2. Rigo E, Dong Z, Hyun J, Kennedy E, Hokmabadi M, Almonte-Garcia L, Aluru N, and **Timp G**. Measurements of the Size and Correlations between Ions using an Electrolytic Point Contact. *Nature Communications*, **10**(1):2382 (2019) doi: 10.1038/s41467-019-10265-2.
3. Kennedy E, Hokmabadi M, Dong Z, McKelvey K, Nelson EM, **Timp G**. Method for Dynamically Detecting Secretions from Single Cells Using a Nanopore. *Nanoletters*, **18** (7), 4263-4272 (2018). doi: 10.1021/acs.nanolett.8b01257.
4. Dong Z, Kennedy E, Hokmabadi M, **Timp G**. Discriminating Residue Substitutions in a Single Protein Molecule Using a Sub-nanopore. *ACS Nano*, **11**(6), 5440-5452 (2017). doi:10.1021/acsnano.6b08452.
5. Kennedy E, Nelson E, Tanaka T, Damiano J, **Timp G**. Gene Expression in Electron-Beam Irradiated Bacteria in Reply to "Live Cell Electron Microscopy is Probably Impossible". *ACS Nano*, **11**(1), 3-7 (2017). doi: 10.1021/acsnano.6b06616.
6. Kolmogorov M, Kennedy E, Dong Z, **Timp G**, Pevzner P. Single-Molecule Protein Identification by Sub-Nanopore Sensors. *PLOS Computational Biology*, **13**(5), e1005356 (2017). doi: https://doi.org/10.1371/journal.pcbi.1005356.
7. Kennedy E, Dong Z., Tennant C, **Timp G**. Reading the primary structure of a protein with 0.07 nm³ resolution using a subnanometre-diameter pore. *Nature Nanotechnology*, **11**, 968-976 (2016). doi: 10.1038/NNANO.2016.120.
8. Kennedy E, Nelson E, Tanaka T, Damiano J, **Timp G**. Live Bacterial Physiology Visualized with Five-

Nanometer Resolution Using Scanning Transmission Electron Microscopy. *ACS Nano*, **10**, 2669-2677 (2016). doi: 10.1021/acsnano.5b07697.

9. Sarveswaran K, Kurz V, Dong Z, Penny S, Tanaka T, **Timp G**. Synthetic Capillaries to Control Microscopic Blood Flow. *Scientific Reports*, **6**, 21885 (2016). doi: 10.1038/srep21885.
10. Perry N, Nelson EM, **Timp G**. Wiring Together Synthetic Bacterial Consortia to Create a Biological Integrated Circuit. *ACS Synth. Biol.*, **5**(12), 1421-1432 (2016). doi: 10.1021/acssynbio.6b00002.
11. McKelvey K, Kurz V, Tanaka T, **Timp G**. Fingerprinting Single Living Cells with Molecular Precision, *Biophys. J.*, **108**(2), 186a (2015). doi: 10.1016/j.bpj.2014.11.1029.
12. Nelson E, Mirsaidov U, Sarveswaran K, Perry N, Kurz V, Timp W, **Timp G**. Ecology of a Simple Synthetic Biofilm. Chapter 11 in *The Physical Basis of Bacterial Quorum Communications*, Hagen, S., ed., *Biological and Medical Physics, Biomedical Engineering*, Springer (New York) 205-226 (2015).
13. Kurz V, Nelson E, Tanaka T, **Timp G**. Detection of the Secretome and Transfection of a Single Cell Using a Nanopore. *ECS Trans.*, **64**(16), 15-19 (2014). doi:10.1149/06416.0015ecst.
14. Nelson E, Li H, **Timp G**. Direct, Concurrent Measurements of the Forces and Currents Affecting DNA in a Nanopore with Comparable Topography. *ACS Nano*, **8**(6) 5484-5493 (2014). doi:10.1021/nn405331t.
15. Kurz V, Tanaka T, **Timp G**. Single Cell Transfection with Single Molecule Resolution Using a Synthetic Nanopore. *ACS Nanoletters*, **14**(2), 604-611 (2014). doi: 10.1021/nl403789z.
16. Nelson EM, Kurz V, Perry N, Timp W, **Timp G**. Biological Noise Abatement: Coordinating the Responses of Autonomous Bacteria to a Fluctuating Environment Using a Stochastic Bistable Switch. *ACS Synthetic Biol.*, **3**(5), 286-297 (2014). doi: 10.1021/sb400052f.
17. Timp W, Nice A, Nelson EM, Kurz V, McKelvey K, **Timp G**. Think Small: Nanopores for Sensing and Synthesis. *IEEE Access*, **2**, 1396-1408 (2014). doi:10.1109/ACCESS.2014.2369506.
18. Kurz V, Nelson EM, Perry N, Timp W, **Timp G**. Epigenetic Memory Emerging from Integrated Transcription Bursts. *Biophys. J.*, **105**, 6 (2013). doi: 10.1016/j.bpj.2013.08.010.
19. Kurz V, Nelson EM, Shim J, **Timp G**. Direct Visualization of Single-Molecule Translocations through Synthetic Nanopores Comparable in Size to a Molecule. *ACS Nano*, **7**(5), 4057-4069 (2013). doi: 10.1021/nn400182s.
20. Nelson EM, Kurz V, Shim J, Timp W, **Timp G**. Using a nanopore for single molecule detection and single cell transfection. *Analyst RSC*, **137**, 3020-3027 (2012). doi: 10.1039/C2AN35571J.
21. Bareiß M, Ante F, Kälblein D, Jegert G, Jirauschek C, Scarpa G, Fabel B, Nelson EM, **Timp G**. Zscheschang U, Klauk H, Porod W, Lugli P, High-Yield Transfer Printing of Metal-Insulator-Metal Nanodiodes. *ACS Nano*, **6**(3), 2853-2859 (2012). doi: 10.1021/nn3004058.
22. **Timp G**, Mirsaidov U, Timp W, Shim J, Wang D, Dimitrov V, Scrimgeour J, Lin C, Comer J, Ho AH, Zou X, Aksimentiev A, Schulten K. 3rd Generation DNA Sequencing with a Nanopore. In *Nanopores: Sensing and Fundamental Biological Interactions*, Iqbal, S. M. and Bashir, R., Chapter 12, 287-312 (2011), Springer, Berlin. ISBN 978-1-4419-8251-3.
23. Lin C, Kolossov VL, Tsvid G, Trump L, Henry JJ, Henderson JL, Rund LA, Kenis P, Schook LB, Gaskins HR, **Timp G**. Imaging in real-time with FRET the redox response of tumorigenic cells to glutathione perturbations in a microscale flow. *Integrative Biology*, **3**, 153-158 (2010). doi: 10.1039/C0IB00071J.
24. Mirsaidov U, Comer J, Dimitrov V, Aksimentiev A, **Timp G**. Slowing the translocation of double-stranded DNA using a nanopore smaller than the double helix. *Nanotechnology*, **21**(39), 395501 (2010). doi: 10.1088/0957-4484/21/39/395501.
25. Mirsaidov U, Wang D, Timp W, **Timp G**. Molecular Diagnostics for Personal Medicine using a Nanopore. *Invited. Wiley Interdisciplinary Reviews-Nanomedicine and Nanobiotechnology*, **2**(4), 367-381 (2010). doi: 10.1002/wnan.86.
26. Timp W, Mirsaidov U, Wang D, Comer J, Aksimentiev A, **Timp G**. Nanopore Sequencing: Electrical Measurements of the Code of Life. *Invited. Transactions on Nanotechnology*, **9** (3), 281-294 (2010). doi: 10.1109/TNANO.2010.2044418.
27. Dimitrov V, Mirsaidov U, Wang D, Sorsch T, Mansfield W, Miner J, Klemens F, Cirelli R, Yemenicioglu, S, **Timp G**. Nanopores in Solid-State Membranes Engineered for Single Molecule Detection, *Nanotechnology*, **21**(6), 065502 (2010). doi: 10.1088/0957-4484/21/6/065502.
28. Dorvel B, Zhao Q, Dimitrov V, Mirsaidov U, Aksimentiev A, **Timp G**. Analyzing the forces binding a restriction endonuclease to DNA using a synthetic nanopore. *Nucleic Acids Research*, **37**(12), 4170-4179 (2009). doi:10.1093/nar/gkp317.
29. Comer J, Dimitrov V, Zhao Q, **Timp G**, Aksimentiev A. Microscopic Mechanics of Hairpin DNA Translocation through Synthetic Nanopores. *Biophys. J.*, **96**, 593-608 (2009).
30. Mirsaidov, U., Timp, W., Zou, X., Dimitrov, V., Schulten, K., Feinberg, A., and **Timp, G.**, Nanoelectromechanics of Methylated DNA in a Synthetic Nanopore, *Biophys. J. Lett.*, **96**(4), L32-

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33. Mirsaidov, U., Scrimgeour, J., Timp, W., Beck, K., Mir, M., Matsudaira, P., and **Timp, G.**, Live Cell Lithography: Using Optical Tweezers to Create Synthetic Tissue. *Lab Chip*, **8**(12), 2174–2181 (2008).
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38. Zhao, Q., Sigalov, G., Dimitrov, V., Dorvel, B., Mirsaidov, U., Sligar, S., Aksimentiev, A., and **Timp, G.**, Detecting SNPs Using a Synthetic Nanopore. *Nano Lett.*, **7**(6), 1680-1685 (2007).
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Alternative Dielectrics. *Proc. 1st European Workshop on Ultimate Integration of Silicon 2000*, Grenoble, France Jan, (2000).

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73. Tennant, D., Klemens, F., Sorsch, T., and **Timp, G.**, Gate Technology for 70nm MOSFETs with Ultrathin (<2nm) Gate Oxides. *J. Vac. Sci Technol. B* **15**(6) 2799-2805 (1997).
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Selected (>150) Presentations (reverse chronological order):

1. 4th Annual Next Generation Sequencing & Clinical Diagnostics USA Congress, **Invited Talk:** "Detecting Secretions from Single Cells Using a Nanopore", **Timp, G.**, Boston, MA October 24, 2018.
2. From Solid State to Biophysics IX, **Invited Talk:** "Sequencing and Discriminating Whole Proteins with a Sub-Nanometer Diameter Pore", **Timp, G.**, Cavtat, Croatia, June 19, 2018.
3. AFM Workshop and Open Lab, **Invited Talk:** "Discriminating Residues in a Single Protein Molecule Using a Sub-nanopore", Notre Dame, IN December 4, 2018.
4. 6th Annual AD&T Symposium, **Invited Talk:** "Reading the Primary Structure of Single Protein Molecules with a Sub-nanometer Diameter Pore to Diagnose Antibiotic Resistance", **Timp, G.**, Notre Dame, IN, March 6, 2018.
5. Select Bio Lab-on-a-Chip Europe 2018 Congress, **Invited Talk:** "Silicon nanotechnology Meets Biology (Smaller and Wetter is Better)", **Timp, G.**, Rotterdam, Netherlands, June 5, 2018.
6. BIT 7th Annual World Congress of Nano Science and Technology, Nanomedicine and Nanobiotechnology Session, **Invited Talk:** "Sequencing and Discriminating Proteins with a Sub-Nanometer Diameter Pore", **Timp, G.**, Fukuoka, Japan, October 25, 2017.
7. **Invited:** "Silicon Nanotechnology Meets Biology (Smaller and Wetter is Better)", **Timp, G.**, National University of Singapore, Singapore, October 20, 2017.
8. Materials Research Science Conference, **Invited Talk:** "Sequencing and Discriminating Whole Proteins with a Sub-Nanometer Diameter Pore", **Timp, G.**, October 27, 2017, Boston, MA
9. Biophysical Society 61st Annual Meeting **Invited Talk**, "Single Molecule Identification Against Proteomes Using Sub-Nanometer Pores", Kennedy, E., Kolmogorov, M., Dong, Z., Pevzner, P.,

and **Timp, G.**, New Orleans, LA, February 15, 2017.

10. Nanoworld 2017, **Invited Talk**: “Using a Sub-nanopore to Discriminate Residue Substitutions in a Single Protein Molecule”, Dong, Z., Kennedy, E., and **Timp, G.**, April 3, 2017, Boston, MA.
11. Harper Cancer Day, “Detecting Secretions from Single Cancer Cells Using a Nanopore” Kennedy, E., Dong, Z., and **Timp, G.**, Harper Cancer Institute, South Bend, IN, April 2017.
12. “Single-Molecule Protein Identification by Nanopore Sensors” American Society of Mass Spectrometry (ASMS), Kolmogorov, M., Kennedy, E., Dong, Z., **Timp, G.**, and Pevzner, P. Indianapolis IN. June 4th, 2017.
13. Nanoworld Conference, (NWC 2016), **Invited Talk**, “Detecting the Sequence of Amino Acids in Protein Molecules with a Picopore”, Kennedy, E., Dong, Z., and **Timp, G.**, Boston, MA, April 5, 2016.
14. Biophysical Society 59th Annual Meeting **Invited Talk**, “Fingerprinting Single Living Cells with Molecular Precision”, Kurz, V., McKelvey, K., Tanaka, T., and **Timp, G.**, Baltimore, MD, February 9, 2015.
15. 18th Sanken International Symposium, **Invited Talk**, “Single Molecule Delivery and Detection by a Nanopore”, Kurz, V., McKelvey, K., Tanaka, T., and **Timp, G.**, Osaka, Japan, December 11, 2014.
16. Functional Analysis & Screening Technologies (FAST) **Invited Talk**, “Synthetic Capillaries: Engineering Microscale Blood Flow”, **Timp, G.**, Boston, MA, November 18, 2014.
17. 226th Electrical Chemical Society (ECS) & SMEQ Joint Meeting, **Invited Talk**, “Detection of the Secretome and Transfection of a Single Cell Using a Nanopore”, Kurz, V., Nelson, E., Tanaka, T., and **Timp, G.**, Cancun, Mexico, October 6, 2014.
18. Global Technology Community (GTC) Bioanalytical Sensors Conference, **Invited Talk**, “Using a Nanopore for Single Molecule Analysis and Single Cell Transfection”, Nelson E., and **Timp G.**, Cambridge, MA, May 22, 2014.
19. NIH Single Cell Analysis Meeting, Tanaka, T., Kurz, V., and **Timp, G.**, Poster, Bethesda, MD, May 2014.
20. Nanostructures: Physics & Technology 22nd International Symposium, **Plenary Address, Invited**, “Regulation and detection of gene expression in a single cell with single molecule resolution using a nanopore”, **Timp, G.**, St. Petersburg, Russia, June 23, 2014.
21. Lab On A Chip European Conference (LOACE), **Keynote Address, Invited**, “New Tools for Synthetic Biology”, **Timp, G.**, Berlin, Germany, March 10, 2014.
22. International Conference on Small Science, Workshop on Nanobiology, **Invited Talk**, “Single cell transfection with single molecule precision using a nanopore”, **Timp, G.**, Las Vegas, December 17, 2013.
23. Functional Analysis & Screening Technologies (FAST) **Invited Short Course**, “Synthetic Capillaries”, **Timp, G.**, Cambridge, MA, October 27, 2013.
24. Advances in Microfluidics and Nanofluidics (AMN 2013), **Keynote Address**, “Single Cell Transfection with Single Molecule Precision Using a Synthetic Nanopore”, **Timp, G.**, University of Notre Dame, May 24, 2013.
25. Lab on a Chip, Single Cell Analysis, **Invited Talk**, “Single Molecule Detection and Single Cell Transfection Using a Nanopore”, **Timp, G.**, Barcelona, Spain, March 3, 2013.
26. Nanostructures: Physics and Technology 2012, **Invited Plenary Talk**, “Using a nanopore for single molecule detection and single cell transfection”, **Timp, G.**, Saratov, Russia, June 26, 2012.
27. Interpore 2012, The Fourth International Conference on Porous Media and Annual Meeting of the International Society for Porous Media, **Invited Talk**, “The Prospects for a Single Cell Secretome: Using a Nanopore for Both Analyte Detection and Cell Transfection”, **Timp, G.**, Purdue University, Lafayette, IN, May 14, 2012.
28. Pazmany Peter Catholic University, **Invited Guest Lecturer**, “New Toolbox for 21st Century Biology I & II”, **Timp, G.**, PPKE University, Budapest, Hungary, April 15-17, 2012.
29. Indiana University- Purdue University (IUPUI), **Invited Talk**, “A Tiny Revolution: New Tools for Synthetic Biology”, **Timp, G.**, Indianapolis, IN, November 11, 2011.
30. London City University, **Invited Talk**, “A Tiny Revolution: New Tools for Synthetic Biology”, **Timp, G.**, London, England, November 1, 2011.
31. ISABEL, **Keynote Address**, “A Tiny Revolution: New Tools for Synthetic Biology”, **Timp, G.**, Barcelona, Spain, October 27, 2011.
32. FNANO, **Invited Talk**, “The Prospects for 3rd Generation DNA Sequencing with a Nanopore”, Shim, J., **Timp, G.**, Snowbird, Utah, April 15, 2011.
33. BioResearch Seminar Series, **Invited Talk**, “A Tiny Revolution in Biomimicry”, **Timp, G.**, MRB,

Aerospace and Civil Engineering Host, University of Notre Dame, March 4, 2011.

34. Biophysical Society Meeting 55th Annual Meeting, March 9, 2011, **Invited Talk**, “Using
35. Measurements of the Ion Current Through a Synthetic Nanopore to Discriminate Nucleotides in a Single DNA Molecule”, **Timp, G.**, Baltimore, MD, March 9, 2011.
36. Argonne National Laboratory, **Invited Talk**, “A Tiny Revolution in Biomimicry”, **Timp, G.**, Argonne, Illinois, March 2, 2011.
37. Pacifichem, **Invited Talk**, “Discriminating between base-pairs in a single molecule of double-stranded DNA trapped in a nanopore”, Timp, W., **Timp, G.**, Honolulu, HI, December 18, 2010.
38. Workshop on Innovative Devices and Systems 2010 (WINDS), **Invited Talk**, “The Prospects for 3rd Generation DNA Sequencing with a Nanopore”, **Timp, G.**, Kohala, HI, December 8, 2010.
39. University of Syracuse, Physics Colloquium, **Invited Talk**, “A Tiny Revolution: New Tools for Synthetic Biology”, **Timp, G.**, Syracuse, NY, November 18, 2010.
40. Nanomedicine 2010, BIT Life Sciences, **Invited Talk**, “The Prospects for 3rd Generation DNA Sequencing with a Nanopore”, **Timp, G.**, Beijing, China, October, 2010.
41. ABRF Conference, **Invited Talk**, “The Prospects for Sequencing a Single Molecule of Double-Stranded DNA in a Nanopore with a diameter smaller than the Double Helix”, **Timp, G.**, Sacramento, CA, March 23, 2010.
42. MNE'09, (35th International Micro & Nano Engineering), IMEC/Functional Nanosystems, **Invited Talk**, “Electronic Recognition of DNA Sequence using a Nanopore”, **Timp, G.**, Ghent, Belgium, September 2009.
43. Nano DDS, (Nanoelectronic Devices for Defense and Security Conference), **Keynote Address**, “Manipulating and Sensing Biomolecules with Nanoscale Semiconductors”, **Timp, G.**, Ft. Lauderdale, Florida, September, 2009.
44. NIMs (National Institute for Materials Science): Nanobio-materials and technologies for breakthroughs in future medicine, **Invited Talk**, “Nanopore Sequencing: Electrical Measurements of the Code of life”, **Timp, G.**, Tsukuba, Japan, July, 2009.
45. Pittcon 2009, (Pittsburgh Conference on Analytical chemistry and Applied Spectroscopy) **Invited Talk**, “Stretching Genes”, **Timp, G.**, Chicago, IL, March 8, 2009.
46. IGB Genome Technology Seminar Series, **Invited Talk** (Institute for Genomic Biology, **Invited Talk**, “A Tiny Revolution: New Tools for Synthetic Biology”, **Timp, G.**, UIUC, Urbana, IL Thursday, Dec. 11, 2008.
47. Physics of Living Cells Conference, **Invited Talk**, “New Tools for Synthetic Biology” Beckman Institute, **Timp, G.**, Urbana, IL, November, 2008.
48. AIChE, 2008 Annual Meeting of the American Electrophoresis Society, Nanoscale Electrokinetics, **Invited Talk**, “Stretching Genes”, **Timp, G.**, Philadelphia, PA, Nov., 2008.
49. DARPA, DSRC Biocompatible Electronics Workshop, **Invited Talk**, “Nanoelectronics Meets Biology”, **Timp, G.**, Arlington, VA, November 5, 2008.
50. Electronic Recognition of Biomolecules (ERBM) 4th Workshop, **Invited Talk, Co-Organizer**, “Sequencing DNA using a Synthetic Nanopore”, **Timp, G.**, Liege, Belgium, September 11, 2008.
51. Gordon Conference, 2008 Bioanalytical Sensors, **Invited Talk**, “A Tiny Revolution”, **Timp, G.**, Bryant University, Smithfield, RI July 3, 2008.
52. Notre Dame, **Invited Talk**, “Stretching, Sifting and Sequencing Genes”, **Timp, G.**, University of Notre Dame, South Bend, IN June 20, 2008.
53. University of Washington, **Invited Talk, EE Colloquium Presentation**, “A Tiny Revolution: New Tools for Synthetic Biology”, **Timp, G.**, University of Washington, Seattle, WA, May 20, 2008.
54. NIH National Human Genome Research Initiative Meeting, **Invited Talk**, “Sequencing DNA using a Synthetic Nanopore”, **Timp, G.**, La Jolla, CA, March 19, 2008.
55. 47th Annual meeting of American Society for Cell Biology (ASCB), **Invited Talk**, “Cell-to-Cell Signaling in Synthetic Tissue”, **Timp, G.**, Washington, DC, December, 2007.
56. ICG-2007, International Conference on Genomics (ICG), **Invited Talk**, “Detecting SNPs using a Synthetic Nanopore”, **Timp, G.**, Shenzhen, China, November, 2007.
57. SRC/NSF Forum on Nano-Morphic Systems: Processes, Devices, and Architectures, **Invited Talk**, “Sensing a Single Molecule using a Synthetic Nanopore”, **Timp, G.**, November, 2007.
58. MicroTAS, **Invited Talk**, “Study of Cell-to-Cell Signaling in Optically Assembled 3D Living Cell Micro-arrays”, **Timp, G.**, Paris, France, October, 2007.
59. Computational Biology Seminar Series, **Invited Talk**, “A Tiny Revolution: New Tools for Synthetic Biology”, **Timp, G.**, IBM, TJ Watson Research Laboratory, Yorktown Heights, NY, August. 16, 2007.

60. 3rd International Conference on Synthetic Biology, **Invited Talk**, “Bacterial Signaling in Synthetic Tissue”, **Timp, G.**, Zurich Switzerland, June, 2007.
61. The Future of Nanotechnology, Cornell Nanofabrication Facility 30th Anniversary, **Invited Talk**, “A Tiny Revolution: New Tools for Synthetic Biology”, **Timp, G.**, Cornell University, Ithaca, NY, June 14, 2007.
62. American Physical Society March meeting, **Invited Talk**, “Molecular Tweezers: Using the Electric Field in a Synthetic Nanopore to Disrupt Biomolecular Binding Forces”, **Timp, G.**, Denver, CO, March 7, 2007.
63. NIH National Human Genome Research Initiative Meeting, **Invited Talk**, “Exploring the Prospects for Sequencing DNA using a Synthetic Nanopore”, **Timp, G.**, Marco Island, Florida February 7, 2007.
64. IEDM, **Invited Talk**, “Prospects for a Nanometer-scale Gene Chip”, **Timp, G.**, San Francisco, CA, December, 2006. AVS meeting, **Invited Talk**, “Force Spectroscopy Using a Synthetic Nanopore”, **Timp, G.**, San Francisco, CA, November, 2006.
65. Electronic Recognition of Bio-molecules 3rd Workshop, **Invited Talk**, “Force Spectroscopy of Biomolecules”, Leige, Belgium September, 2006.
66. 2nd Annual Meeting of the Academy of Nanomedicine, “Force Spectroscopy Using a Synthetic Nanopore”, **Invited Talk, Timp, G.**, Washington, DC September, 2006.
67. \$1000 Genome Workshop, **Invited Talk**, “Towards Sequencing DNA using a Synthetic Nanopore”, **Timp, G.**, Fort Myers, FL, February, 2006.
68. NSF Nanoscale Science and Technology Meeting, **Invited Talk**, “Laser-Guided Assembly of Nanosystems”, **Timp, G.**, Arlington, VA, December, 2005.
69. Nanomaterials and Nanotechnologies Conference, **Invited Talk**, “Trapping and Detecting a Single Molecule Using a Synthetic Nanopore”, **Timp, G.**, University of Tohoku, Sendai, Japan, October, 2005.
70. Electronic Recognition of Bio-molecules 2nd Workshop, **Invited Talk**, “Using a Synthetic Nanopore as a Molecular Trap”, **Timp, G.**, University of Illinois, Beckman Institute, Urbana, IL, September, 2005.
71. 1st Meeting of the Academy of Nanomedicine, **Invited Talk**, “Toward a Nanometer-scale Gene Chip”, **Timp, G.**, Baltimore, MD, August 2005.
72. Chemical and Bio-molecular Seminar, **Invited Talk**, “Using a Synthetic Nanopore to Trap and Detect DNA”, **Timp, G.**, University of Illinois, Urbana, IL, September, 2005.
73. Nanostructures: Physics & Nanotechnology Symposium, **Invited Talk**, “Single Molecule Detection Using a Silicon Nanopore”, **Timp, G.**, St. Petersburg, Russia, June, 2005.
74. American Vacuum Society Meeting, **Invited Talk**, “Single Molecule Detection Using a Silicon Nanopore”, **Timp, G.**, Northwestern University, Evanston, IL May, 2005.
75. NJNC Nanotechnology Conference, **Plenary Talk**, “Silicon Nanotechnology”, **Timp, G.**, Murray Hill, NJ, February, 2005.
76. Beckman Institute Director's Seminar, **Invited Talk**, “Single Molecule Detection using Silicon Nanotechnology”, **Timp, G.**, University of Illinois, April, 2004.
77. American Vacuum Society Meeting, **Invited Talk**, “Silicon Nanopores”, **Timp, G.**, Albuquerque, NM, May, 2004.
78. Pan-American Advanced Studies Institute for Micro & Electromechanical Systems, **Invited Talk**, “Single Molecule Detection using Silicon Nanotechnology”, **Timp, G.**, San Carlos de Bariloche, Patagonia, Argentina, June, 2004.
79. International Conference on Superlattices and Nanostructures, **Invited Talk**, “Molecular Transport through Nanometer-diameter pores in nanometer-thick membranes”, **Timp, G.**, Cancun, Mexico, July, 2004.
80. Electronic Recognition of Bio-molecules Workshop, **Invited Talk**, “Silicon Nano-biotechnology”, **Timp, G.**, University of Liege, Liege, Belgium, September, 2004.
81. International Society for Optical Engineering (SPIE Optics East) Nanofabrication Conference, **Invited Talk**, “Silicon Nano-biotechnology”, **Timp, G.**, Philadelphia, PA, Oct., 2004.
82. MOLDICE meeting (DARPA), **Invited Talk**, “Single Molecule Detection Using a Silicon Nanopore-Nanotransistor”, **Timp, G.**, Savannah, GA, October, 2004.
83. Applied Mathematics Seminar, “Silicon Nano-biotechnology”, **Invited Talk, Timp, G.**, University of Illinois, Urbana, IL, December, 2004.
84. SIMBIOSYS meeting (DARPA), **Invited Talk**, “Using Silicon Nanopores for Single Molecule Detection”, **Timp, G.**, Monterey, CA, September 2003.
85. International Symposium on Mesoscopic Physics, **Invited Talk**, “Using Silicon Nanopores for

- Single Molecule Detection”, **Timp, G.**, TJ Watson Research Center, IBM, Yorktown Heights, NY, November, 2003.
86. Nanoscale Science and Engineering Conference, **Invited Talk**, “Nanometer-scale Gene Chip”, **Timp, G.**, Arlington, VA, December, 2003.
 87. University of Illinois-Industrial Symposium on Nano-biotechnology, **Invited Talk**, “Using Silicon Nanopores for Single Molecule Detection”, **Timp, G.**, Levis Faculty Center, Urbana, IL, May, 2003.
 88. Nano-Science and Technology Workshop, **Invited Talk**, “Advanced Nanofabrication”, **Timp, G.**, Argonne National Laboratory, August 2003.
 89. Biophysical Society Meeting, “Electrolytic Transport through A Synthetic Nanopore”, **Timp, G.**, Baltimore, MD, February, 2004.
 90. BIOFLIPS Workshop, **Invited Talk**, “Silicon Nanopores”, **Timp, G.**, Palm Springs, CA, March, 2004.
 91. International Electron Device Meeting, “The Detection of DNA Using a Silicon Nanopore”, **Timp, G.**, Washington, DC, December, 2003.
 92. American Vacuum Society Meeting, **Invited Talk**, “Using Silicon Nanopores for Single Molecule Detection”, **Timp, G.**, Boston, MA, November, 2003.
 93. Zyvex Incorporated, **Invited Talk**, “Nanobiotechnology”, **Timp, G.**, Richardson, Texas, May, 2003.
 94. American Vacuum Society meeting, **Invited Talk**, “Silicon Nano-biotechnology”, **Timp, G.**, Denver, CO, November, 2002.
 95. Korean Vacuum Society meeting, **Plenary Talk**, “Nano-biotechnology: at the interface between silicon and the cell”, **Timp, G.**, Seoul, South Korea, Feb., 2002.
 96. Advanced Workshop on the Frontiers of Electronics, **Invited Talk**, “Nano-biotechnology:at the interface between silicon and the cell”, **Timp, G.**, WOFE(2002): St. Croix, Virgin Islands, USA, January 8, 2002.
 97. 2001 Electrochemical Society Meeting, **Invited Talk**, “The Nanotransistor”, **Timp, G.**, Bude, J., Bourdelle, K.K., et al., San Francisco, CA September 4-6, 2001.
 98. 2nd Nanotransistor Workshop, **Invited Talk**, “The Nanotransistor”, **Timp, G.**, Bude, J., Bourdelle, K.K., et al., Gaithersburg, MD August 13-17, 2001.
 99. Workshop on Quantum Transport, **Invited Talk**, “The Nanotransistor”, **Timp, G.**, Bude, J., Bourdelle, K.K., et al., Maratea, Italy, June 12-20, 2001.
 100. Molecular Nanoscience Alliance for Interdisciplinary Studies and Activities: MONALISA, **Plenary Talk**, “The Integrated Circuit and the Relentless March to Zero Nanometers”, **Timp, G.**, University of Minnesota, Minneapolis MN, April 2001.
 101. AVS 47th International Symposium, **Invited Talk**, “35nm CMOS Technology and the Unrelenting March to Zero Nanometers”, **Timp, G.**, Bude, J., Bourdelle, K.K., et al., Boston, MA, October 2-6, 2000.
 102. Silicon Nanoelectronics Workshop, **Invited Talk**, “The Ballistic Nano-transistor and the Scale of Complexity in an IC”, **Timp, G.**, Bude, J., Bourdelle, K.K., et al., Honolulu, Hawaii, June 9-10, 2000.
 103. Applied Physics of Nanostructure Materials, **Invited Talk**, “Silicon Nanoelectronics”, **Timp, G.**, Arlington, VA, Dec. 15, 1999.
 104. International Electron Device Meeting Washington, “The Ballistic Nano-transistor”, **Timp, G.**, Bude, J., Bourdelle, K.K., et al., DC, Dec., 1999.
 105. International Symposium on Surface Science for Micro- and Nano-Device Fabrication, “35nm CMOS Technology and the Unrelenting March to Zero”, **Invited Talk, Timp, G.**, Tokyo, Japan Nov., 1999.
 106. Weir, B.E., Silverman, P.J., Sorsch, T.W., and **Timp, G.**, **Invited Talk**, Gate Oxides in 50nm Devices: Thickness Uniformity Improves Projected Reliability. Proc. International Electron Device Meeting, 1999.
 107. 10th Workshop on Dielectrics in Microelectronics, **Invited Talk**, “The Relentless March of the Gate Oxide thickness to Zero”, **Timp, G.**, Barcelona, Spain, Nov., 1999
 108. Fall Meeting of the MRS Society, **Invited Talk**, “Progress Toward a 30nm Silicon MOS Gate Technology”, D. Tennant, **Timp, G.**, et al., Boston, MA, Nov. 1999.
 109. 1st International Workshop on Dielectric Thin Films for Future ULSI Devices: Science and Technology, **Invited Talk**, “Future ULSI Devices with 1.5-2.5nm Gate Oxides”, B. Weir, P.J. Silverman, **Timp, G.**, Tokyo, Japan, October, 1999.
 110. Conference on Next Generation Materials and Devices for Si-based Microelectronics, **Invited Talk**, “The Relentless March to Zero Nanometers”, **Timp, G.**, Shanghai, China, June, 1999.
 111. Materials Research Society Spring Meeting, **Invited Talk**, “Toward a 35nm CMOS Technology”,

- Timp, G.**, San Francisco, CA April, 1999.
112. American Physical Society 80th Topical Symposium on the Physics of Communications, **Invited Talk**, “The Incredible Shrinking Integrated Circuit”, **Timp, G.**, Murray Hill, NJ, April, 1999.
 113. Insulating Films on Semiconductors, **Invited Talk**, “Understanding the Physical and Electrical Limits of Ultra-thin Silicon Dioxide”, Green, M., Muller, D., Sorsch, T., et al. and **Timp, G.**, Erlangen/Loster Banz, Germany, June, 1999.
 114. International Electron Device Meeting, **Invited Talk**, “Progress Toward 10nm CMOS”, **Timp, G.**, San Francisco, CA, December, 1998.
 115. International Electron Device Meeting, (Post-Deadline Paper) “Ultra-thin Gate Oxides and Ultra-shallow Junctions for High Performance, sub-100nm pMOSFETs”, **Timp, G.**, San Francisco, CA, December, 1998.
 116. 1998 Symposium on VLSI Technology, “Ultra-thin, 1.0-3.0nm, Gate Oxides for High performance sub-100nm Technology”, **Timp, G.**, Honolulu, Hawaii, June, 1998.
 117. Atom Optics Workshop, **Invited Talk**, “Laser Focused Atomic Deposition for Nanometer-scale Lithography”, Copenhagen, Denmark, January, 1998.
 118. MRS 1998 Spring Meeting, **Invited Talk**, “Rapid Thermal Growth of Ultra-thin Oxides and Oxy-nitrides for ULSI”, Green, M., Sorsch, T.W., **Timp, G.**, San Francisco, CA, April, 1998.
 119. Atoms and Electron in Periodic Potentials Workshop, **Invited Talk**, “High Resolution Laser- Focusing of Thermal Atomic Beams”, **Timp, G.**, Les Houche, France, January 25-31, 1997.
 120. American Physical Society March meeting, **Invited Talk**, “High Resolution Laser-Focusing Thermal Atomic Beams”, **Timp, G.**, St. Louis, MO, March, 1996.
 121. International Conference on Quantum Devices and Circuits, **Invited Talk**, “Focusing a Thermal Atomic Beam with Nanometer Resolution Using a Laser”, **Timp, G.**, Natarajan, V., Behringer, R.E., June 2-7, 1996, Alexandria, Egypt.
 122. Solid State Physics colloquium, **Invited Talk**, “Focusing a Thermal Atomic with Nanometer Resolution Using a Laser”, **Timp, G.**, Purdue, University February 22-23, 1996, Lafayette, Indiana.
 123. 3rd International Symposium on Nanostructures and Mesoscopic Systems, **Invited Talk**, “Focusing a Thermal Atomic Beam with Nanometer Resolution Using a Laser”, Behringer, R.E., **Timp, G.**, Natarajan, V., May 19-24, 1996 Santa Fe, NM.
 124. 40th International Conference on Electron, Ion and Photon Beam Technology and Nanofabrication, “Focusing a Thermal Atomic Beam with Nanometer Resolution Using a Laser”, Behringer, R.E., **Timp, G.**, Natarajan, V., Atlanta, GA, May, 1996.
 125. Quantum Electronics and Laser Science Conference, “Focusing a Thermal Atomic Beam with Nanometer Resolution Using a Laser”, Behringer, R.E., **Timp, G.**, Natarajan, V., Anaheim, CA, June 2-7, 1996.
 126. 38th Electronic Materials Conference, “Focusing a Thermal Atomic Beam with Nanometer Resolution Using a Laser”, Behringer, R.E., **Timp, G.**, Natarajan, V., Santa Barbara, CA, June 26-28, 1996.
 127. 43rd National Symposium of the American Vacuum Society, “Focusing a Thermal Atomic Beam with Nanometer Resolution Using a Laser”, Behringer, R.E., **Timp, G.**, Natarajan, V., Philadelphia, PA, Oct 14-18, 1996.
 128. Electron, Ion and Photon Beams meeting, “Nanolithography Using a Laser Focused Neutral Atom Beam”, **Timp, G.**, Scottsdale, AZ, May, 1995.
 129. 8th International Conference on Superlattices, Microstructures and Microdevices, **Invited Talk**, “Superlattice Fabrication Using an Optical Standing Wave to Focus an Atomic Beam”, **Timp, G.**, Cincinnati OH, August, 1995.
 130. Conference on Chemistry of Electronic Materials, **Invited Talk**, “Using Light as a Lens to Focus a Neutral Atomic Beam”, **Timp, G.**, Gordon, Ventura, CA, March, 1994.
 131. American Physical Society, April Meeting, Division of Atomic Molecular and Optical Physics, **Invited Talk**, “Using Light as a Lens to Focus a Neutral Atomic Beam”, **Timp, G.**, Crystal City, VA, April, 1994.
 132. Workshop for Gifted and Talented Students “Moving Atoms with a Light Touch”, **Timp, G.**, Monmouth College, January, 1994.
 133. PHANTOMS, **Plenary Talk**, “Laser Focused Sodium Deposition”, **Timp, G.**, Leuven, Belgium April, 29th, 1993.
 134. American Physical Society Meeting March meeting, **Invited Talk**, “Using Light as a Lens for Neutral Atom Optics”, **Timp, G.**, Seattle, WA, March 22-26, 1993.
 135. National Research Council, **Invited Talk**, “Using Light as a Lens for Neutral Atom Optics”,

- Behringer, R.E., and **Timp, G.**, Ottawa, Canada March, 1993.
136. Governor's Fellows Math and Science Teachers Conference, **Invited Talk**, "Using Light to Focus Atoms", **Timp, G.**, Holmdel, NJ, July, 1993.
 137. Workshop on Quantum-Effect Physics, Electronics & Applications, **Invited Talk**, "Using Light as a Lens", **Timp, G.**, Luxor, Egypt, Jan., 1992.
 138. Nordic Research Conference on Mesoscopic Physics, **Invited Talks**, "1. Using Light as a Lens, and 2. The Smallest Electronic Device" **Timp, G.**, Flugocenter, Denmark, May, 1992.
 139. Optical Society of America, **Invited Talk**, "Demonstration of Submicron Direct Write Optical Lithography with Cold Atoms", Prentiss, M., Berggren, K.K., **Timp, G.**, Albuquerque, NM, May, 1992.
 140. Future Electron Devices meeting, **Invited Talk**, "Using Light as a Lens for Nano-Lithography with Neutral Atoms", **Timp, G.**, Nasu Heights, Japan, May, 1992.
 141. OELS Conference, **Invited Talk**, "Demonstration of Submicron Direct Write Optical Lithography with Cold Atoms", Prentiss, M., Berggren, K.K., **Timp, G.**, May 1992.
 142. Gordon Conference on Microstructure Fabrication, **Invited Talk**, "Using Light as a Lens for Submicron, Neutral Atom Lithography", **Timp, G.**, Meriden, NH, July, 1992.
 143. University of Maryland Physics Colloquium, **Invited Talk**, "Using Light as a Lens for Submicron Lithography with Neutral Atoms", **Timp, G.**, College Park, MD, Oct., 1992.
 144. IBM, Yorktown Heights Physics Colloquium, **Invited Talk**, "Using Light as a Lens for Submicron Lithography with Neutral Atoms", **Timp, G.**, Yorktown Heights, NY, Dec., 1992.
 145. Nanolithography and Nanoengineering, Engineering Foundation, **Invited Talk**, "Using Light as a Lens for Submicron Lithography with Neutral Atoms", Behringer, R.E., **Timp, G.**, Kona, Hawaii, December, 1992.
 146. International Symposium on Nanostructures and Mesoscopic Systems, **Invited Talk**, "Can a Device be made with Atomic Precision?" **Timp, G.**, Santa Fe, NM, May, 1991.
 147. 38th Scottish Universities Summer School in Physics on Physics of Nanostructures, **Invited Talk**, "Can a Device be made with Atomic Precision?" **G. Timp**, St. Andrews, Scotland, July, 1991.
 148. NATO Advanced Study Institute on Condensed Systems of Low Dimensionality, **Invited Talk**, "The Smallest Electronic Device", **G. Timp**, Marmaris, Turkey, April, 1990.
 149. 8th International Conference on the Electronic Properties of Two-dimensional Systems, **Invited Talk**, "Fractional Quantization of the Hall resistance near $(h/e^2)/(1/2)$ ", **Timp, G.**, Grenoble, France, Sept. 4-8, 1989.
 150. International Symposium on Nanostructure Physics and Fabrication, **Invited Talk**, "One Dimensional Ballistic Transport", **Timp, G.**, Texas A&M University, College Station, TX, March, 1989.
 151. Seminars on Quantum Electrical Engineering, **Invited Talk**, "Suppression of the Aharanov-Bohm Effect in the Quantized Hall regime", **Timp, G.**, Minneapolis, MN, Oct. 1988.
 152. 1st bilateral Seminar between the Soviet Union and United States, **Invited Talk**, "Quantum Transport in a Constricted Two-Dimensional Electron Gas", Institute for Solid State Physics, **Timp, G.**, Moscow, U.S.S.R., May 29-June 3, 1988.
 153. American Physical Society March meeting, **Invited Talk**, "Coherent Transport in One Dimension", **Timp, G.**, New Orleans, LA, March 21-25, 1988.
 154. 5th International Winter School on Solid State Physics, **Invited Talk**, "Quantum Transport in One-Dimensional GaAs/AlGaAs Microstructures", **Timp, G.**, Salzberg, Austria, February 22-29, 1988.
 155. Summer School on Electron Transport in Small Systems, **Invited Talk**, "Coherent Transport in One Dimension", **Timp, G.**, Trieste Italy, August, 1988.
 156. 7th International Conference on the Electronic Properties of Two-dimensional Systems, **Invited Talk**, "Quantum Transport in One-Dimensional GaAs/AlGaAs Microstructures", **Timp, G.**, Santa Fe, NM, July, 1987.

Selected Patents:

1. October 24, 2016, "A Picometer-Diameter Pore in an Inorganic Membrane for Sequencing Protein", Patent Application #PCT/US16/58519
2. June 10, 2014, "Characterizing Stretched Polynucleotide in a Synthetic Nanopassage", Patent No. 8,748,091, University of Illinois
3. April 22, 2014, "Solid State Device" US Patent No. 8,702,929, University of Illinois
4. February 15, 2009 "Detecting and Sorting Methylated DNA Using a Synthetic Nanopore", U.S. Patent No. 8,394,584, University of Illinois
5. August 7, 2007, Subject: Method of Fabricating a Composite Gate Dielectric Layer, Patent No. 7,

253,063, Lucent Technologies

6. January 18, 2005, Subject: A Silicon Oxide Based Gate Dielectric Layer, Patent No. 6844076, Lucent Technologies.
7. February 17, 2004 Subject: A Silicon Oxide Based Gate Dielectric Layer, Patent No. 6693051, Lucent Technologies.
8. September, 1999, Subject: Scanning Depletion microscopy for Carrier Profiling, Patent No. 6417673 Lucent Technologies
9. April 21, 1986, Subject: Electron Tuned Quantum Well Device, Patent No. Y0 985 059 (European Patent Office, Netherlands), IBM.
10. July 17, 1990, Subject: Electron Tuned Quantum Well Device, US Patent No. 4942437, IBM