

## Deirdre R. Meldrum, Ph.D.

### Contact

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 Director, Center for Biosignatures Discovery Automation, Biodesign Institute  
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### Education

Institution	Degree	Year
Stanford University	Ph.D. E.E.	1993
Rensselaer Polytechnic Institute	M.S. E.E.	1985
University of Washington	B.S. Civ.E.	1983

Stanford Graduate School of Business, Interpersonal Dynamics for High-Performance Executives—2009  
 Stanford Executive Program – 2009

### Patents

6+ patents (3 issued, 3+ pending)

### Publications

158+ (65 peer-reviewed journal, 86 peer-reviewed conference proceedings, 4 book chapters)

### Research

Over \$30M in active sponsored research  
 Over \$15M in pending sponsored research  
 Over \$45M in completed sponsored research

### Employment

#### Arizona State University

ASU Senior Scientist	Jan. 2011 – present
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Leading major new initiative on Biosignatures to transform health care in the United States. The goal is to enable the prediction of disease risk and the prevention of disease, with pre-symptomatic diagnosis and interventional therapeutic treatment of individuals based upon their personal biosignature. The effort will lead to the development of a national-scale laboratory for biosignature discovery (using normal and disease specific biorepositories), clinical validation, standardization (quality control, sample storage, pathology characterization, molecular and cell analytes, and distribution to research centers), and qualification (with the Food and Drug Administration (FDA) for use in pre-symptomatic diagnoses, drug development research, commercialization, and patient management) for healthy patient outcomes.

Dean, Ira A. Fulton Schools of Engineering

Jan. 2007 – Dec. 2010

<http://www.fulton.asu.edu/fulton/>

Led School with about 7,000 students, 210 faculty, and 300 staff to build the “Engineering School of the Future” aligned with the New American University <http://newamericanuniversity.asu.edu/> being created at ASU <http://www.asu.edu>, and focused on NAE grand challenges <http://www.engineeringchallenges.org/> and the NAE Engineer 2020 <http://www.nae.edu/nae/engeducom.nsf/weblinks/MCAA-5L3MNK?OpenDocument> .

From Jan. 2007 to Dec. 2010:

Created vision (with leadership team, faculty, staff, and students): “Leading engineering discovery and innovative education for global impact on quality of life”

Created mission (with leadership team, faculty, staff, and students): “Provide an environment rich in transdisciplinary research, education, entrepreneurship, and leadership resulting in successful engineers and technologies that benefit society”

Created 8 major goals with quantitative metrics:

*Research*—Advance quality research and disseminate discoveries that benefit science, technology and society

*Rigorous* – Deliver rigorous, relevant and innovative engineering education

*Recruit* – Recruit talented and diverse students, faculty, and staff

*Retain* – Retain talented and diverse students, faculty, and staff

*Resources* – Achieve global recognition for excellence in engineering, education and discovery

*Recognition* – Achieve global recognition for excellence in engineering, education and discovery

*Relationships* – Provide a positive, interactive, entrepreneurial working and learning environment

*Responsible* – Develop and practice responsible leadership that drives progress and produces results

Managed annual budget of about \$50M

Implemented service-oriented culture and quantitative metrics to measure success and impact

Created and implemented Engineering Staff Success Program (ESSP)

Reorganized the School from 10 traditional discipline-based departments to 5 schools (with 14 degree programs) based on grand challenge themes (health, sustainability, energy, security, exploration, and education) to focus on our impact on society in research and education and realize our vision

Hired 74 new faculty (19 women)

Hired 1 Nobel Laureate

Increased total student enrollment from 6,343 to 7,015

Increased freshmen enrollment from 774 to 1,157 (70% awarded scholarships)

Increased Research Expenditures from \$55.5M to \$74.2M

Renewed Flexible Display Center grant for \$50M from the U.S. Army

Pending award for first NSF Engineering Research Center to ASU (awaiting govt. budget, 2011)

Seeded interdisciplinary groups of faculty for grand challenges research leading to large center grants

Raised \$94M in donations from individuals, foundations, and corporations

Increased program offerings and enrollment in Global Outreach and Extended Education (on-line) to students and professionals around the world

Launched project in Vietnam with funding from Intel and USAID to train engineering faculty in Vietnam and grow the engineering work force

Mentored junior faculty to win 15 NSF CAREER Awards

Hired and built team of 5 Engineering Educator faculty to advance engineering education

Implemented revised freshmen year curriculum for students

Implemented 4+1 programs (4 year bachelor + 1 year masters) for all degree programs

Led successful ABET review of all undergraduate engineering degree programs in the Schools

Opened Engineering Student Center

Launched Engineering Career Center

Launched Engineering Projects in Community Service (EPICS) at ASU

Expanded Engineers without Borders Program at ASU

Expanded Fulton Undergraduate Research Initiative (FURI)

Implemented NAE Grand Challenge Scholars Program (one of first in country)

Founded E2 (Engineering Excellence) 3-day camp for all incoming freshmen

Became host of the State of Arizona FIRST LEGO League (robotics program) regional and state competitions for students 9 to 14 years old  
 General Chair for IEEE International Conference on Automation Science and Engineering, CASE 2011 (about 200 people)  
 General Chair for IEEE EMBS/RAS International BioRob 2008 (about 200 people)  
 General Chair for NAE Grand Challenges Summit 2010 in Phoenix (about 600 people)  
 General Chair for NSF Ocean Observing Initiative Science Workshop 2010 (about 100 people)

Professor of Electrical Engineering, School of Electrical, Computer and Energy Engr. 2007 – present  
 Director, Center for Ecogenomics, Biodesign Institute 2007 – 2010  
 Director, Center for Biosignatures Discovery Automation, Biodesign Institute 2010 – present  
<http://cbda.biodesign.asu.edu>  
 Lead Center with about 60 researchers (students, postdocs, research scientists, engineers, and research faculty) on developing new automated technologies for biological analyses from human health and disease to the environment; the oceans.

PI and Director, NIH Center of Excellence in Genomic Sciences 2007 – present  
 “Microscale Life Sciences Center”  
 Lead development of microscale systems for live single cell analyses with 10 investigators at ASU, University of Washington, Fred Hutchinson Cancer Research Center, and Brandeis University.

### University of Washington

PI and Director, NIH Center of Excellence in Genomic Sciences 2001 – 2006  
 “Microscale Life Sciences Center”  
 Led development of microscale systems for live single cell analyses with 10 investigators at ASU, University of Washington, Fred Hutchinson Cancer Research Center, and Brandeis University.  
 Professor, Dept. of Electrical Engineering 2001 – 2006  
 Adjunct Professor, Dept. of Mechanical Engr. 2001 – 2006  
 Adjunct Professor, Dept. of Bioengineering 2001 – 2005  
 Associate Professor with tenure, Dept. of Electrical Engineering 1998 – 2001  
 Adjunct Associate Professor, Dept. of Bioengineering 1998 – 2001  
 Adjunct Assistant Professor, Dept. of Bioengineering 1997 – 1998  
 Assistant Professor, Dept. of Electrical Engineering 1992 – 1998

### Other Employment

Stanford University, Electrical Engineering 1987 – 1992  
 NASA Fellow and Amelia Earhart Fellow  
 Jet Propulsion Laboratory/Caltech 1984 – 1987  
*Galileo Flight Test Group, Guidance and Control Section*  
*Machine Intelligence Systems Group, Automated Systems Section*  
 Washington State Department of Transportation 1982 – 1983  
 Design Engineer  
 NASA Johnson Space Center 1980 – 1981  
 Shuttle Mission Simulator instructor for astronauts  
 Puget Sound Naval Shipyard 1979  
 Engineer

### Consulting

Exelixis Pharmaceuticals, Inc., South San Francisco, CA: biotechnology automation 1997 – 1999  
 Climos, Inc., Alexandria, VA: Member, Scientific Advisory Board 2007 – 2011  
 Microsoft Research, Bellevue, WA: Member, Advisory Board 2007 – present

### Special Government Appointments

Member, National Human Genome Advisory Council, NIH 2011 – present  
 Member, Swiss National Science Foundation International Review Panel,

SystemsX (Systems Biology) Program	2009 – 2011
Member, National Human Genome Advisory Council, NIH	2006 – 2008
Member, Peer Review Oversight Group (PROG), Office of the Director, NIH	2000 – 2004
Member, Scientific Advisory Board, Joint Genome Institute, DOE	2000 – 2002

### Awards and Honors

Chair, National Academy of Engineering, Grand Challenges Summit, Phoenix	2010
Chair, Advisory Board, IEEE Transactions on Automation Science and Engineering	2010 – present
Member, NIH NIAID/DMID Genomics Blue Ribbon Panel	2010
Spanson Best Paper of IEEE CASE 2007 award	2007
Best Student Paper of IEEE CASE 2007 award	2007
Best Paper of the Year 2006, IEEE Transactions on Automation Science and Engineering	2006
Distinguished Lecturer for IEEE Robotics and Automation Society	2006 – 2009
Dive in the Alvin submersible off R/V Atlantis to 2200 m below sea level	2006
W.M. Keck Foundation, National Academies' Future Initiative, "The Genomics Revolution: Implications for Science and Health," Planning Committee	2005
IEEE Fellow for "contributions to genome automation"	2004
AAAS Fellow for "innovative engineering research and leadership in genome automation"	2003
Founding Editor (1 of 4) for IEEE Transactions on Automation Science and Engineering	2003 – 2009
PI and Director, NIH NHGRI Center of Excellence in Genomic Science (CEGS), "Microscale Life Sciences Center"	2001 – 2011
UW CoE Outstanding Faculty Award for Control Systems Laboratory and Curriculum	1997
University of Idaho Honors Convocation Speaker	1997
Presidential Early Career Award for Scientists and Engineers (President Clinton)	1996 – 2001
NAE First Annual Symposium on Frontiers of Engineering (1 of 95 invited participants)	1995
NIH NCHGR Special Emphasis Research Career Award	1993 – 1998
SAE Ralph R. Teetor Educational Award	1993
NASA Graduate Student Researchers Fellowship	1989 – 1992
Zonta International Amelia Earhart Fellowship	1989 – 1991
Scholars Toppers Award, Rensselaer Polytechnic Institute	1983 – 1984
Luther E. Gregory Scholarship, University of Washington	1981 – 1983

### Professional Society Memberships

Fellow, IEEE	2004 – present
Fellow, AAAS	2003 – present
Member, HUGO (Human Genome Organization)	2001 – present
Member, American Chemical Society	1999 – present
Member, AWIS	1996 – present
Member, Sigma Xi	1994 – present
Member, SAE	1993 – 1996
Member, AAAS	1992 – present
Member, AIAA	1992 – 2006
Member, IEEE	1987 – present
Electron Devices Society	1997 – present
Engineering, Medicine, and Biology Society	1992 – present
Computer Society	1992 – 2006
Vehicular Technology Society	1992 – 2006
Education Society	1992 – present
Robotics and Automation Society	1987 – present
Systems, Man, and Cybernetics Society	1987 – 2006
Control Systems Society	1987 – 2006
Member, Society of Women Engineers	1980 – present
Member, ASCE	1980 – 1985

## Patents

### Patents awarded

1. R. Seubert, M. V. Olson, D. R. Meldrum, B. Hannaford, P. Wiktor, N. A. Friedman, D. B. Snow, and R. Kraft, "Precision Small Volume Fluid Processing Apparatus," Patent # 5,785,926, July 28, 1998.
2. R. Kraft, N. A. Friedman, D. Meldrum, R. Seubert, "Precision Small Volume Fluid Processing Apparatus and Method," Patent # 6,218,193 B1, April 17, 2001.
3. S. Kim, B. Amirparviz, D. Meldrum, E. Saeedi, "Self-Assembled Heterogeneous Integrated Optical Analysis System," Patent # 7,910,934, March 22, 2011.

### Patents pending

1. Holl, Mark; Meldrum, Deirdre; Young, A. Cody; Zhu, Haixin; Houkal, Jeff; Tian, Yanqing; Ashili, Shashanka; Kelbaskas, Laimonas; Johnson, Roger; Chao, Joseph; Wiktor, Peter; Kahn, Peter; Brunner, Al; Jen, Alex; Burgess, Lloyd; McQuaide, Sarah. "Device and method for the study of cell and tissue function," *PCT Int. Appl. (2010)*, 42pp. *WO 2010062654 A2 20100603*; *Application: WO 2009-US62380 20091028*. *Priority: US 2008-108998, 20081028*.
2. Holl, Mark; Houkal, Jeff; Martineau, Rhett; Bessette, Greg; Vannela, Raveender; Zhou, Chao; Kim, Hyun Woo; Sheng, Jie; Sadayandi, Sindhuja; Bank, Daniel; Vela, Juan; Rittmann, Bruce; Westerhoff, Paul; Meldrum, Deirdre. "Modular experimental platform for microorganism physiology and scale-up studies," *PCT Int. Appl. (2010)*, 19pp. *Application: WO 2009-US59643 20091006*. *Priority: US 2008-103489 20081007*.
3. Holl, Mark; Meldrum, Deirdre; Anis, Yassir; Ashili, Shashanka; Houkal, Jeff; Johnson, Roger; Kelbaskas, Laimonas; Li, Yongzhong; Merza, Saeed; Nandakumar, Vivek; Smith, Dean; Young, Cody; Tian, Yanqing; Zhu, Haixin; Chao, Joseph. "Integrated, automated system for the study of cell and tissue function," *PCT Int. Appl. (2010)*, 115pp. *Application: WO 2009-US54781 20090824*. *Priority: US 2008-91036 20080822*.

## Publications

### Peer-Reviewed Journal Publications

1. D. S. Bayard, F. Y. Hadaegh, and D. R. Meldrum, "Optimal experiment design for identification of large space structures," *Automatica: Journal of International Federation of Automatic Control*, vol. 24, no. 3, pp. 357-364, May 1988. ([doi:10.1016/0005-1098\(88\)90076-3](https://doi.org/10.1016/0005-1098(88)90076-3)), [http://www.sciencedirect.com/science?\\_ob=MImg&\\_imagekey=B6V21-47WVH6C-G-1&\\_cdi=5689&\\_user=56861&\\_pii=0005109888900763&\\_origin=gateway&\\_coverDate=05%2F31%2F1988&\\_sk=999759996&\\_view=c&\\_wchp=dGLzVzb-zSkzS&md5=ca4f193df0655b4aa1226248cfd346e3&ie=/sdarticle.pdf](http://www.sciencedirect.com/science?_ob=MImg&_imagekey=B6V21-47WVH6C-G-1&_cdi=5689&_user=56861&_pii=0005109888900763&_origin=gateway&_coverDate=05%2F31%2F1988&_sk=999759996&_view=c&_wchp=dGLzVzb-zSkzS&md5=ca4f193df0655b4aa1226248cfd346e3&ie=/sdarticle.pdf)
2. J. T. Wen and D. R. Meldrum, "Discrete-time model reference adaptive control using CGT concept," *NASA Tech Briefs Journal*, vol. 13, no. 3, p. 48, March 1989.
3. D. R. Meldrum, "Engineering in genomics: The interdisciplinary nature of genomics," *IEEE Engineering in Medicine and Biology*, vol. 14, no. 4, pp. 443-448, July/August 1995 [invited].
4. E. Tongco and D. R. Meldrum, "Optimal sensor placement and active vibration suppression of large flexible space structures," *AIAA Journal of Guidance, Control, and Dynamics*, pp. 961-963, July-August 1996.
5. Deirdre Meldrum, "A biomechatronic fluid sample handling system for DNA processing," *IEEE/ASME Transactions on Mechatronics*, special issue on Mechatronics in Manufacturing, vol. 2,

- no. 2, pp. 99-109, June 1997 [invited].  
<http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=588628>
6. Lauren Sjoboen and Deirdre Meldrum, "Compact jam resistant capillary dispenser for automation systems," *Laboratory Robotics and Automation*, vol. 10, pp. 15-17, 1998.  
<http://onlinelibrary.wiley.com/doi/10.1002/%28SICI%291098-2728%281998%2910:1%3C15::AID-LRA3%3E3.0.CO;2-0/pdf>
  7. H. T. Evensen, D. R. Meldrum, and D. L. Cunningham, "Automated fluid mixing in glass capillaries," *AIP Review of Scientific Instruments*, vol. 69, no. 2, pp. 519-526, Feb. 1998. (doi:10.1063/1.1148690),  
[http://rsi.aip.org/resource/1/rsinak/v69/i2/p519\\_s1](http://rsi.aip.org/resource/1/rsinak/v69/i2/p519_s1)
  8. Neal Friedman and Deirdre Meldrum, "Capillary tube resistive thermal cycling," *Analytical Chemistry*, vol. 70, no. 14, pp. 2997-3002, July 15, 1998. (doi: 10.1021/ac971303n),  
<http://pubs.acs.org/doi/pdf/10.1021/ac971303n>
  9. C. Taylor and D. R. Meldrum, "Fuzzy ramp metering: design overview and simulation results," *Transportation Research Record*, no. 1634, pp. 10-18, November 1998.  
<http://dx.doi.org/10.3141/1634-02> , <https://trb.metapress.com/content/cx117528276h3685/resource-secured/?target=fulltext.pdf>
  10. E. B. Arutunian, D. R. Meldrum, N. A. Friedman, and S. E. Moody, "Flexible software architecture for user-interface and machine control in laboratory automation," *BioTechniques*, vol. 25, no. 4, pp. 698-700, 702, 704-705, October 1998.  
[http://www.biotechniques.com/multimedia/archive/00006/98254bi01\\_6469a.pdf](http://www.biotechniques.com/multimedia/archive/00006/98254bi01_6469a.pdf)
  11. Marco Daoura and Deirdre Meldrum, "Precise automated control of fluid volumes inside glass capillaries," *IEEE Journal of Microelectromechanical Systems*, vol. 8, no. 1, pp. 71-77, March 1999.  
<http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=749405>
  12. H. T. Evensen, D. R. Meldrum, C. Saenphimmachak, and E. E. Dixon, "High-density small-volume gel loading directly from capillary tubes," *BioTechniques*, vol. 27, no. 5, pp. 974-978, 1999.  
[http://www.biotechniques.com/multimedia/archive/00010/99275st05\\_10032a.pdf](http://www.biotechniques.com/multimedia/archive/00010/99275st05_10032a.pdf)
  13. D. R. Meldrum, H.T. Evensen, W. H. Pence, S. E. Moody, D. L. Cunningham, and P. J. Wiktor, "ACAPELLA-1K, a capillary-based submicroliter automated fluid handling system for genome analysis," *Genome Research*, vol. 10, no. 1, pp. 95-104, January 2000.  
<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC310502/pdf/x16.pdf>
  14. D. R. Meldrum, H.T. Evensen, W.H. Pence, S.E. Moody , D.L. Cunningham, and P.J. Wiktor, "ACAPELLA-1K, a biomechatronic fluid handling system for genome analysis that processes 1000 samples in 8 hours," *IEEE/ASME Transactions on Mechatronics*, vol. 5, no. 2, pp. 212-220, June 2000 [invited]. (doi:10.1109/3516.847094),  
<http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=847094>
  15. Deirdre Meldrum, "Automation for genomics: Part 1, preparation for sequencing," *Genome Research*, vol. 10, no. 8, pp. 1081-1092, August 2000 [invited]. (doi:10.1101/gr.101400),  
<http://genome.cshlp.org/content/10/8/1081.full.pdf+html>
  16. Deirdre Meldrum, "Automation for genomics: Part 2, sequencers, microarrays, and future trends," *Genome Research*, vol. 10, no. 9, pp. 1288-1303, September 2000 [invited]. (doi:10.1101/gr.157400),  
<http://genome.cshlp.org/content/10/9/1288.full.pdf+html>
  17. D. Meldrum, "Sequencing genomes and beyond," *Science*, vol. 292, no. 5516, pp. 515, 517, 20 April 2001 [invited by editor]. (doi:10.1126/science.292.5516.515),  
<http://www.sciencemag.org/content/292/5516/515.full>

18. Deirdre R. Meldrum and Mark R. Holl, "Microscale bioanalytical systems," *Science*, vol. 297, no. 5584, pp. 1197-1198, 16 August 2002 [invited by editor]. (doi: 10.1126/science.297.5584.1197), <http://www.sciencemag.org/content/297/5584/1197.full.pdf>
19. Mary E. Lidstrom and Deirdre R. Meldrum, "Life-on-a-Chip," *Nature Reviews Microbiology*, vol. 1, no. 2, pp. 158-164, November 2003 [invited by editor]. (doi:10.1038/nrmicro755), <http://www.nature.com/nrmicro/journal/v1/n2/pdf/nrmicro755.pdf>
20. J. Koschwanetz, M. Holl, B. Marquardt, J. Dragavon, L. Burgess, D. Meldrum, "Identification of budding yeast using a fiber-optic imaging bundle," *Review of Scientific Instruments*, vol. 75, no. 5, pp. 1363-1365, May 2004. Also selected for the May 1, 2004 issue of *Virtual Journal of Biological Physics Research*. (doi:10.1063/1.1710702), [http://rsi.aip.org/resource/1/rsinak/v75/i5/p1363\\_sl](http://rsi.aip.org/resource/1/rsinak/v75/i5/p1363_sl)
21. J. Koschwanetz, and D. Meldrum, "Picture Perfect," *OE Magazine*, 4, 28-30, Nov/Dec 2004 [invited by editor].
22. Tracy Fung, Gregory Ball, Sarah McQuaide, Shih-Hui Chao, Alejandro Colman-Lerner, Mark Holl, Deirdre Meldrum, "Microprinting of on-chip cultures: Patterning of yeast cell microarrays using concanavalin-a adhesion," *Advances in Bioengineering*, pp. 373-374, 2004.
23. Shih-Hui Chao, Mark R. Holl, John H. Koschwanetz, Rob H. Carlson, Ling-Sheng Jang, and Deirdre R. Meldrum, "Velocity measurement in microchannels with a laser confocal microscope and particle linear image velocimetry," *Microfluidics and Nanofluidics*, 10 December 2004 (online), , vol. 1, no. 2, pp. 155-160, May 2005. (doi:10.1007/s10404-004-0023-6), <http://www.springerlink.com/content/b4gnmjf3f87d71tx/fulltext.pdf>
24. Jang, L.S., S. H. Chao, M. R. Holl, and D. R. Meldrum, "Microfluidic circulatory flows induced by resonant vibration of diaphragms," *Sensors and Actuators A: Physical*, vol. 122, no. 1, pp. 141-148, 29 July 2005. (doi:10.1016/j.sna.2005.03.070), [http://www.sciencedirect.com/science?\\_ob=MIImg&\\_imagekey=B6THG-4GG2HYT-1-N&\\_cdi=5282&\\_user=56861&\\_pii=S0924424705001561&\\_origin=gateway&\\_coverDate=07%2F29%2F2005&\\_sk=998779998&\\_view=c&\\_wchp=dGLbVlW-zSkWA&\\_md5=a59b7d76f973fa08174655b55ab1b52b&\\_ie=/sdarticle.pdf](http://www.sciencedirect.com/science?_ob=MIImg&_imagekey=B6THG-4GG2HYT-1-N&_cdi=5282&_user=56861&_pii=S0924424705001561&_origin=gateway&_coverDate=07%2F29%2F2005&_sk=998779998&_view=c&_wchp=dGLbVlW-zSkWA&_md5=a59b7d76f973fa08174655b55ab1b52b&_ie=/sdarticle.pdf)
25. Shen Pan, Gidon Shavit, Marta Penas-Centeno, Dong-Hui Xu, Linda Shapiro, Richard Ladner, Eve Riskin, Wim Hol, and Deirdre Meldrum, "Automated Classification of Protein Crystallization Images Using Support Vector Machines with Scale-Invariant Texture and Gabor Features," *Acta Crystallographica Section D Biological Crystallography*, vol. D62, no. 3, pp. 271-279, March 2006. (doi:10.1107/S0907444905041648), <http://journals.iucr.org/d/issues/2006/03/00/cy5031/cy5031.pdf>
26. Patrick Ngatchou, Mark Holl, Charles Fisher, Mohan Saini, Jianchun Dong, Timothy Ren, William Pence, David Cunningham, Stephen Moody, Douglas Donaldson, and Deirdre Meldrum, "A real-time qPCR analyzer compatible with high-throughput automated serial processing of 2  $\mu$ L reactions in glass capillaries," *IEEE Transactions on Automation Science and Engineering*, vol. 3, no. 2, pp. 141-151, April 2006 (special issue on automation in the life sciences; won Best Paper of the Year 2006). <http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=1613914>
27. Deirdre R. Meldrum, "Automated systems for genome analyses," *Journal of the Robotics Society of Japan*, vol. 24, no. 5, pp. 570-572, July 2006.
28. Shih-hui Chao, Robert Carlson, and Deirdre Meldrum, "Rapid fabrication of microchannels using microscale plasma activated templating ( $\mu$ PLAT) generated water molds," *Lab-on-a-chip*, vol. 7, no. 5, pp. 641-643, May 2007. (doi: 10.1039/B618269K), <http://pubs.rsc.org/en/content/articlepdf/2007/lc/b618269k>

29. John Koschwanetz, Robert Carlson, Deirdre Meldrum, "Easily fabricated magnetic traps for single-cell applications," *Review of Scientific Instruments*, vol. 78, no. 4, pp. 44301/1-5 pages, published on-line, 17 April 2007. Also selected for the April 30, 2007, issue of *Virtual Journal of Nanoscale Science and Technology*, <http://www.vjnano.org>. (doi: 10.1063/1.2722400), [http://rsi.aip.org/resource/1/rsinak/v78/i4/p044301\\_s1](http://rsi.aip.org/resource/1/rsinak/v78/i4/p044301_s1)
30. A. Cody Young, Joe Dragavon, Tim Strovass, Tim Molter, Lixin Zheng, Lloyd Burgess, Alex K.-Y. Jen, Mary E. Lidstrom, Deirdre R. Meldrum, "Two-photon lithography of platinum porphyrin oxygen sensors," *IEEE Sensors*, vol. 7, issue 6, pp. 931-936, June 2007. <http://ieeexplore.ieee.org/stamp/stamp.jsp?arnumber=04162476>
31. Szu-Yuan Lee, Chun-Nan Lee, Mark Holl, Deirdre R. Meldrum, Chih-Kung Lee, Chii-Wann Lin, "Optimal hepatitis B virus primer sequence design for isothermal amplification," *Biomedical Engineering – Applications, Basis and Communications*, vol. 19, no. 3, pp. 137-144, June 2007. (doi: 10.4015/S1016237207000215), <http://www.worldscinet.com/bme/19/1903/S1016237207000215.html>
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87. Konstantinos Petritis, Mark Holl, Deirdre Meldrum, Matthew Rosenow, "Specificity and throughput challenges and solutions in protein biomarker verification/validation," *American Society for Mass Spectrometry 2011*, Denver, Colorado, June 5-9, 2011.
88. Wandaliz Torres-Garcia, Shashanka Ashili, Laimonas Kelbauskas, Weiwen Zhang, George C. Runger, and Deirdre Meldrum, "Statistical framework for multiparameter analysis at the single-cell level," *BMIC 2011*, Orlando, FL, July 19-22, 2011.

**Non-Journal Abstracts and Posters (Podium presenter underlined)**

1. D. R. Meldrum and R. Seubert, "An automated sample handler for genome analysis," poster and abstract presented at the *Automation in Mapping and DNA Sequencing Conference*, The Sanger Centre, Hinxton, England, September 1994.
2. D. R. Meldrum and R. Seubert, "An automated sample handler for genome analysis," poster and abstract presented at the *Genome Sequencing and Analysis Conference VI*, Hilton Head, S.C., September 1994.
3. D. R. Meldrum, R.C. Seubert, R.H. Kraft, P.J. Wiktor, N. Friedman, M. Daoura, E. Tongco, "Automated restriction enzyme digest and PCR analysis in glass capillaries," talk and poster presented at the *Third International Conference on Automation in Mapping and DNA Sequencing*, Berkeley, California, November 1995. Abstract published in the conference proceedings; invited as 1 of 44 speakers at the conference with 250 participants (attendance limited).
4. D. R. Meldrum, "Automated submicroliter sample preparation in glass capillaries," *IBC Automated DNA Sample Preparation Workshop*, Marina del Rey, California, March 20, 1996. Invited and funded by IBC as 1 of 6 speakers with 250 participants.
5. D. R. Meldrum, "Capillary automated submicroliter sample preparation," *CHI Commercial Implications of the Human Genome Project Conference*, San Francisco, February 1997. Invited and funded by CHI.
6. D. R. Meldrum, "Capillary automated submicroliter sample preparation," *Fourth International Conference on Automation in Mapping and DNA Sequencing*, Heidelberg, Germany, March 1997. Abstract published in conference proceedings; invited as 1 of 40 speakers at the conference with 250 participants (attendance limited).
7. D. R. Meldrum, H. T. Evensen, W. H. Pence, S. E. Moody, D. L. Cunningham, E. B. Arutunian, S. V. Kunig, J. M. Reiter, N. A. Friedman, W. Hai, "Experimental Results of the Acapella System for High-Throughput Automated Submicroliter Fluid Sample Preparation," *Fifth International Conference on Automation in Mapping and DNA Sequencing*, St. Louis, October 7-10, 1998.
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9. D.R. Meldrum, H. T. Evensen, W. H. Pence, S. E. Moody, D. L. Cunningham, N. A. Friedman, E. B. Arutunian, M. Saini, and M. Holl, "High-throughput automated fluid sample handling with thermal cycling," *G2K Back to Science: Advances in Genome Biology and Technology I*, Marco Island, Florida, Feb. 5-8, 2000 [invited as 1 of 4 speakers; attendance 500].
10. D.R. Meldrum, J. Peccoud, D. Sabath, W. Pence, S. Moody, D. Cunningham, and N. Friedman, "Automated minimal residual disease quantification," NIH National Cancer Institute, *Innovative Molecular Analysis Technologies Program*, Chantilly, Virginia, July 6-8, 2000.
11. D. R. Meldrum, W. H. Pence, S. E. Moody, D. L. Cunningham, M. Saini, E. B. Arutunian, A. M. Torok, V. Mosesov, M. Holl, "Submicroliter fluid handling instrumentation for genome analysis," *Biomedical Engineering Society 2000 Annual Meeting*, Seattle, Oct. 12-14, 2000.
12. M. Holl, T. Paulson, B. Rabkin, E. Gibbons, T. F. Kosar, D. R. Meldrum, "Integrated microsystem for classification, sorting, and storage of cellular nuclei based on DNA content from a tissue biopsy," *Biomedical Engineering Society 2000 Annual Meeting*, Seattle, Oct. 12-14, 2000.

13. D.R. Meldrum, W.H. Pence, S.E. Moody, D.L. Cunningham, M. Saini, M. Holl, P. J. Wiktor, "Sensors, actuators, and automated microfluidics for genomics," *G2K Back to Science: Advances in Genome Biology and Technology*, Marco Island, Florida, Feb. 4-8, 2001 [invited].
14. D.R. Meldrum, W.H. Pence, S.E. Moody, D.L. Cunningham, M. Saini, M. Holl, P. J. Wiktor, "Sensors, actuators, and automated microfluidics for genomics," *HGM2001 Human Genome Meeting*, Edinburgh, Scotland, April 19-22, 2001 [invited].
15. D. R. Meldrum, M. Holl, T. Mann, C. Fisher, M. Saini, D. Sabath, D. L. Cunningham, S. E. Moody, W. H. Pence, "Automated Minimum Residual Disease Quantification," NIH National Cancer Institute, *Innovative Molecular Analysis Technologies Program*, Washington D.C., June 27-29, 2001.
16. D.R. Meldrum, M.E. Lidstrom, M. Holl, W. Pence, "Integrated biologically-active microsystems," *G2K Back to Science: Advances in Genome Biology and Technology*, Marco Island, Florida, Feb. 6-9, 2002 [invited].
17. D.R. Meldrum, "Cytometric microsystems for the Human Genome Project," *International Society of Analytical Cytology XXI International Congress*, San Diego, California, May 3-9, 2002 [invited plenary].
18. D.R. Meldrum, "Life-on-a-chip," *IEEE International Symposium on Circuits and Systems 2002*, Scottsdale, Arizona, May 26-29, 2002 [invited plenary].
19. D. R. Meldrum, C. Fisher, M. Holl, P. Ngatchou, M. Saini, J. Dong, D. Sabath, S. Moody, D. Cunningham, W. Pence, "Automated Minimum Residual Disease Quantification," NIH National Cancer Institute, *Innovative Molecular Analysis Technologies Program*, Chantilly, Virginia, July 8-10, 2002 [invited plenary].
20. D.R. Meldrum, "MEMS modules for life-on-a-chip," *Advances in Genome Biology and Technology*, Marco Island, Florida, Feb. 4-8, 2003 [invited plenary].
21. Deirdre R. Meldrum, Charles Fisher, Patrick Ngatchou, Jianchun Dong, Mohan Saini, Mark Holl, William Pence, Stephen Moody, David Cunningham, and Daniel Sabath, "Automated minimal residual disease quantification," NIH National Cancer Institute, *Innovative Molecular Analysis Technologies Program*, San Diego, June 14-16, 2003.
22. D.R. Meldrum, "Life-on-a-chip," *Taiwan National Science Council and UW Bioengineering Conference*, Taipei, Taiwan, December 17, 2003 [invited].
23. D.R. Meldrum, "High-throughput automation for functional genomics," *Taiwan National Science Council and UW Bioengineering Conference*, Taipei, Taiwan, December 19, 2003 [invited].
24. D.R. Meldrum, Mark Holl, Joseph Chao, "Detecting response at the cellular level," *Advances in Genome Biology and Technology*, Marco Island, Florida, Feb. 4-7, 2004 [invited plenary].
25. D. R. Meldrum, W. G. Hol, M. R. Holl, S. McGuire, C. H. Fisher, L. DeSoto, M. Robien, R. Ladner, E. Riskin, L. Shapiro, J. Wang, "High-throughput, capillary-based protein crystallography," *NIH NIGMS Protein Production and Crystallization Workshop*, Bethesda, Maryland, March 29-31, 2004 (oral presentation, poster, and abstract) [invited].
26. D. Meldrum and M. Lidstrom, "CEGS Microscale Life Sciences Center (MLSC) 'life-on-a-chip'," *Centers of Excellence in Genomic Sciences Second Annual Grantee Meeting*, National Human Genome Research Institute, National Institutes of Health, Stanford University, Stanford, CA, October 21-22, 2004.

27. Gidon Shavit, Marta Penas, Dong-Hui Xu, Richard Ladner, Linda Shapiro, Eve Riskin, Larry DeSoto, Wim G. Hol, and Deirdre Meldrum, "Crystal image classification with support vector machines and perceptual groupings," *NIH NIGMS Protein Production and Crystallization Workshop*, Bethesda, Maryland, February 2-3, 2005.
28. Mark Holl, Shih-hui Chao, John Koschwanez, Robert Carlson, Barry Lutz, Sarah McQuaide, Diego Barrettino, Elena Martin, Pahnit Seriburi, Joseph Peach, Jonathan Hiller, Andrew Miller, Charles Fisher, Mohan Saini, Shawn McGuire, Timothy Ren, William Pence, Stephen Moody, David Cunningham, Douglas Donaldson, Peter Wiktor, Deirdre Meldrum, "Development of genome and chemical analysis modules and integrated systems: from analysis of single cells to production rate sequencing," *Advances in Genome Biology and Technology*, Marco Island, Florida, Feb. 9-12, 2005.
29. Deirdre Meldrum, "Microsystems for multi-parameter single-cell analysis for disease and cancer research," *Engineering Conferences International (ECI), Biochemical Engineering XIV, Frontiers and Advances in Biotechnology, Biological and Biomolecular Engineering*, Harrison Hot Springs, July 10-14, 2005.
30. Mark Holl, Larry DeSoto, Shawn McGuire, Linda Shapiro, Eve Riskin, Wim Hol, and Deirdre Meldrum, "High-Throughput Automated Protein Crystallization in Plastic Capillaries," *The Fifth Protein Structure Initiative "Bottlenecks" Workshop*, Bethesda, Maryland, April 13-14, 2006.
31. Mark Holl, Thomas Neumann, Melissa W. Crawford, Shawn McGuire, Mark Fauver, Michael G. Meyer, Florence W. Patten, Alan C. Nelson, and Deirdre R. Meldrum, "Automated cell preparation in tubes for 3D microscopy," *Seventh Principal Investigator's Meeting for the Innovative Molecular Analysis Technologies (IMAT) Program*, Bethesda, Maryland, September 7-8, 2006.
32. W. Gao, W. Zhang, and D. R. Meldrum, "qRT-PCR based quantitative analysis of gene expression in a single prokaryotic cell," *American Society for Microbiology*, Poster I-2685, San Diego, May 25-28, 2010.
33. J. Wu, W. Gao, X. Shi, Y. Jin, W. Zhang and D. R. Meldrum, "Active oxygenic photoautotrophic microbes in deep-sea mesopelagic zone of the pacific ocean," *American Society for Microbiology*, Poster Q-1847, San Diego, May 25-28, 2010.
34. Yanqing Tian, Wen-Chung Wu, Ching-Yi Chen, Sei-Hum Jang, Meng Zhang, Tim Strovas, Yongzhong Li, Yuguang Jin, Fengyu Su, Brad Cookson, Alex K.-Y. Jen and Deirdre R. Meldrum, "Delivery of a red two-photon absorbing emitter into mouse macrophage RAW cells using poly(ethylene glycol)-*b*-poly(epsilon-caprolactone) block copolymers," *Pacificchem 2010*, Honolulu, HI, December 15-20, 2010.
35. Yanqing Tian, Bradley R. Shumway, Deirdre R. Meldrum, "Fluorescent Sensing of pH and/or Dissolved Oxygen Using Membranes Made from Polymerizable Sensing Monomers," *Pacificchem 2010*, Honolulu, HI, December 15-20, 2010.
36. Fengyu Su, Vivek Nandakumar, Laimonas Kelbauskas, Yanqing Tian, Yuguang Jin, Celeste Riley, Brent Vernon, Roger H. Johnson, and Deirdre R. Meldrum, "Nanohybrid gel of polyethylene glycol and silica as a matrix for cell-CT imaging," *Pacificchem 2010*, Honolulu, December 15-20, 2010.
37. Meldrum, Deirdre, "Biosignatures Automation for Improved Human Health," *IEEE CASE 2011*. Plenary presentation, Trieste, Italy, August 25-27, 2011.

### Conference General Chair Welcomes (published)

1. Paolo Dario, Deirdre Meldrum, "Forward," Proceedings of the 1<sup>st</sup> IEEE/RAS-EMBS International Conference on *Biomedical Robotics and Biomechatronics, BioRob 2006*.
2. Deirdre Meldrum, Mike Tao Zhang, "Welcome message from the conference general chairs," *Proceedings of the 3<sup>rd</sup> IEEE International Conference on Automation Science and Engineering, IEEE CASE 2007*.
3. Deirdre R. Meldrum, Oussama Khatib, "Welcome message from the conference general chairs," *Proceedings of the 2<sup>nd</sup> Biennial IEEE/RAS-EMBS International Conference on Biomedical Robotics and Biomechatronics, BioRob 2008*.

### Book Chapters

1. D. R. Meldrum and M. J. Balas, "The application of model reference adaptive control to a flexible robot arm: a summary," in Recent Trends in Robotics, Modeling, Control and Education, Ed. by M. Jamshidi, J.Y.S. Luh and M. Shahinpoor, North-Holland, pp. 213-220, 1986.
2. D. R. Meldrum and E. C. Tongco, "Petri net modeling and simulation for automated systems," in Automation Technologies for Genome Characterization, T. Beugelsdijk, ed., John Wiley: New York, pp. 257-278 (Chapter 12), 1997.
3. Fan, Erkang; Baker, David; Fields, Stanley; Gelb, Michael H.; Buckner, Frederick S.; Van Voorhis, Wesley C.; Phizicky, Eric; Dumont, Mark; Mehlin, Christopher; Grayhack, Elizabeth; Sullivan, Mark; Verlinde, Christophe; DeTitta, George; Meldrum, Deirdre R.; Merritt, Ethan A.; Earnest, Thomas; Soltis, Michael; Zucker, Frank; Myler, Peter J.; Schoenfeld, Lori; Kim, David; Worthey, Liz; LaCount, Doug; Vignali, Marissa; Li, Jizhen; Mondal, Somnath; Massey, Archana; Carroll, Brian; Gulde, Stacey; Luft, Joseph; DeSoto, Larry; Holl, Mark; Caruthers, Jonathan; Bosch, Juergen; Robien, Mark; Arakaki, Tracy; Holmes, Margaret; Le Trong, Isolde; Hol, Wim G. J., "Structural genomics of pathogenic protozoa: an overview," Methods in Molecular Biology, Editors: B. Kobe, M. Guss, and T. Huber, Vol. 426, 497-513, 2008.
4. Peiming Zhang, Jin He, Stuart Lindsay, Jian Gu, Weimin Gao, Weiwen Zhang, Deirdre R. Meldrum, "Next-Generation and future DNA sequencing technologies and metagenomics," in Robert W. Li (Ed.), Metagenomics and Its Applications in Agriculture, Biomedicine, and Environmental Studies, NOVA SCIENCES Publishers, October 2010.

### Book Contribution

1. L. Ritter and S. Ambrose, A Woman's Guide to Navigating the Ph.D. in Engineering and Science, IEEE Press, 2001.

### Project Reports

1. D. Meldrum and C. Taylor, "Freeway traffic data prediction using artificial neural networks and development of a fuzzy logic ramp metering algorithm," *Washington State Transportation Center*, National Technical Information Service, Final Technical Report WA-RD 365.1, 89 pages, April 1995.
2. C. Taylor and D. Meldrum, "Simulation testing of a fuzzy neural ramp metering algorithm," *Washington State Transportation Center*, National Technical Information Service, Final Technical Report WA-RD 395.1, 64 pages, October 1995.
3. C. Taylor and D. Meldrum, "On-line implementation of a fuzzy neural ramp metering algorithm," *Washington State Transportation Center*, National Technical Information Service, Research Report WA-RD 442.1, 60 pages, August 1997.

4. C. Taylor and D. Meldrum, "Documentation of TSMC software that interfaces with traffic analysis programs," *Washington State Transportation Center*, National Technical Information Service, Research Report WA-RD 442.2, 170 pages, August 1997.
5. C. Taylor and D. Meldrum, "A programmer's guide to the fuzzy logic ramp metering algorithm: software design, integration, testing, and evaluation," *Washington State Transportation Center*, National Technical Information Service, Research Report WA-RD 481.3, 120 pages, February 2000.
6. C. Taylor and D. Meldrum, "Evaluation of a fuzzy logic ramp metering algorithm: a comparative study between three ramp metering algorithms used in the greater Seattle area," *Washington State Transportation Center*, National Technical Information Service, Research Report WA-RD 481.2, 60 pages, February 2000.
7. C. Taylor and D. Meldrum, "Algorithm design, user interface, and optimization procedure for a fuzzy logic ramp metering algorithm: a training manual for freeway operations engineers," *Washington State Transportation Center*, National Technical Information Service, Research Report WA-RD 481.1, 114 pages, February 2000.

#### **Instruments Designed and Built in Our Lab**

1. ACAPELLA-5K an instrument for automated fluid sample handling (e.g. sequencing reactions for DNA sequencing, real-time PCR, protein crystallography)
2. Laser scan head and optical detection platform. Single photon counting and high speed laser scanning and detection box.
3. Cell automation platform for single cell drawdowns.
4. Closed peristaltic fluid system with inline Clark electrodes and optodes for fluid dissolved chemical and gas calibration.
5. Automated cell manipulation platform by capillary aspiration and dispensing made possible by piezoactuated picoliter/minute pump.

#### **Custom Instruments Built for Our Lab**

1. XCaliber (Potomac Photonics Inc.) Multi-wavelength laser ablation machine. Any material (metals, plastics, glass, crystals, etc.) may be diced into arbitrary shapes with resolutions as high as 5 microns. Material thicknesses are up to 10 millimeters and measure 40cm square.
2. Rainmaker (Engineering Arts and Aurigin Tech) Picoliter volume piezoelectric liquid patterning system. Aspiration and patterning of viscous and nonviscous liquid droplets which may be loaded with proteins, chemical sensors, etc.
3. Non-contact photolithography System (Intelligent Microsystems, Inc.) Full field of view digital light projection of UV radiation of bitmap images into wafers coated in photoresist allows 1.5micron resolution polymer features to be patterned over the complete wafers (with the aid of digital stitching).
4. Multigas MFC Manifolds (Arizona Valve and Fitting with Alicat Scientific) High resolution, computer controlled, compact, mass and volume flow systems for four (and three) line mixing of up to 30 different gases types.
5. Droplet Analyzer (FirstTenAngstroms) Contact angle/ hanging pendent analyzer for surface energy and material constant measurement. Constants that can be analyzed include viscosity, density, and even gas permeability.

6. Cell-CT (VisionGate) Three dimensional optical tomographic imaging of single cells.
7. Dual Confocal Laser Microscope System (Nikon and Melles Griot) LiveScan (combined laser scanning and rapid stage movement) and standard confocal microscope system with a suit of lasers from 400nm-632nm for fluorescence scanning microscopy, spectroscopy, and confocal video acquisition.

## Research Support

### Over \$30M in Active Sponsored Research + Over \$15M Pending

NIH National Human Genome Research Institute, 5 P50 HG002360, “CEGS: Microscale Life Sciences Center,” \$12,774,801 (direct), \$18,139,790 (with indirect), PI and Director (with investigators M. Lidstrom, K. Bohringer, L. Burgess, B. Cookson, N. Dovichi, M. Holl, B. Parviz, B. Reid, (and Lisa Peterson for the Minority Action Plan)), **funded**, 8/1/06 – 7/31/11.

NSF, “Partnership, Pathway and Pipeline for Engineering Education: Engaging Middle School Students with Curricular Integration and Societal Relevance,” \$99,830, PI, **funded**, 01/01/09 – 12/31/11.

Translational Genomics Research Institute, “Automation for High-Throughput Proteomics,” \$550,000, PI, **funded**, 02/01/09 – 05/31/11.

NIH National Human Genome Research Institute, 5 P50 HG002360, “CEGS: Microscale Life Sciences Center – Supplement for Providing Summer Research Experiences for Students and Science Educators,” \$143,853 (direct), \$183,106 (with indirect), PI, **funded**, 06/01/09-05/31/11.

NIH National Human Genome Research Institute, 5 P50 HG002360, “CEGS: Microscale Life Sciences Center – Supplement to Promote Diversity in Health Related Research,” \$251,473, PI, **funded**, 05/18/09 – 05/17/11.

NIH National Institute of General Medical Sciences, 1 R01 GM088818, “Water Soluble Nanoarrays for Single Cell Proteomics,” \$1,050,000 (direct), \$1,527,062 (with indirect), Investigator (PI – Hao Yan), **funded**, 08/01/09 – 05/31/14.

NIH National Human Genome Research Institute, 5 P50 HG002360, “CEGS: Microscale Life Sciences Center – Supplement for Cell-Cell Analyses,” \$606,499 (direct), \$910,150 (with indirect), PI, **funded**, 09/30/09 – 08/31/11.

NIH National Cancer Institute, U54 CA143862, “A Center for the Convergence of Physical Science and Cancer Biology,” \$2,573,738 (direct), \$3,409,687 (with indirect), Investigator and Project Leader (PI – Paul Davies; Investigators: R. Ros, S. Lindsay, D. Meldrum, T. Newman, R. Culbertson, P. Davies), **funded**, 09/30/09 – 08/31/11.

Moore Foundation, “Integrated qPCR and Microarray Analytical Modules for 3G-ESP,” \$1,842,794 (direct), \$2,043,432 (with indirect), Co-Investigator, **funded**, 11/01/10-10/31/14.

NSF, 09104447, “Nanoscale Science and Engineering Center / Center for Nanotechnology in Society at ASU,” \$5,024,421 (direct), \$ 6,507,000 (with indirect), PI David Guston, co-PI Deirdre Meldrum, **funded**, 10/01/10 – 09/30/15.

NSF – DEB, 0950179, “MSB: Collaborative Research: Biological Stoichiometry of Microbes Under Severe P-Limitation,” \$597,140 (direct), \$894,811 (with indirect), Co-PI (PI – Elser), **funded**, 08/01/10-07/31/14.

Keck Foundation, “Live-Cell Computed Tomography Instrumentation Development,” \$1,743,228 (direct), \$2,424,958 (with indirect), PI, **funded**, 01/01/11 – 12/31/14.

NIH, “Structure-Activity Relationships of Biologically Relevant Polymer Nanostructures in Normal and Cancer cells,” \$1,715,192 (direct), \$2,496,356 (with indirect), Co-Investigator, **pending**, 07/01/11-06/30/16.

NSF, “Platform Technologies for Intra- and Inter-Kingdom Multicellular Signaling Research,” \$1,249,866 (direct), \$1,788,760 (with indirect), PI, **pending**, 04/01/11-03/31/14.

NIH, “Live-Cell Microarray for High-Throughput Observation of Metabolic Signatures,” \$1,000,000 (direct), \$1,409,685 (with indirect), PI, **pending**, 09/01/11 – 08/31/13.

NSF, “A New Approach for Multiparameter Analysis of Phenotypic and Gene Expression Alterations in Single Interacting Cells,” \$1,389,287 (direct), \$1,999,446 (with indirect), PI, **pending**, 10/01/11 – 09/30/15.

NSF, “OTIC: A High-Throughput, High-Resolution Camera for Robust Reconstruction of Three-Dimensional Underwater Structures,” \$438,310 (direct), \$626,472 (with indirect), Co-PI, **pending**, 10/01/11 – 09/30/14.

NSF, “Development and Application of New Ratiometric Optical Oxygen, pH, and CO<sub>2</sub> Triad Sensors with Four Emission Colors for High-Throughput Analysis of Photosynthetic Organisms,” \$409,487 (direct), \$598,893 (with indirect), Co-PI, **pending**, 11/01/11 – 10/31/14.

NSF, “RET Site Program with a Focus on National Academy of Engineering’s Grand Challenges for Engineering,” \$487,500 (with indirect), Co-PI, **pending**, 09/01/11 – 08/31/14.

DOD, “Detection of Changes in Health Status and Source of any Infection Using Peptide Array Chips,” \$18,085,249 (direct), \$24,343,798 (with indirect), Co-Investigator, **pending**, 04/01/11 – 03/31/15.

NSF, “EFRI-MIKS: A New Approach for Multiparameter Analysis of Phenotypic and Gene Expression Alterations in Interacting Cells,” \$1,389,287 (direct), \$1,999,446 (with indirect), PI, **pending**, 11/01/11-10/31/15.

### **Over \$43M in Completed Sponsored Research**

UW Graduate School Fund, “Spatial Operator Algebra Modeling and Control for Flexible Structures,” \$9,900, PI, funded, Jan. 1993-Sept. 1993.

UW Graduate School Fund, “Colloquium Series in Robotics and Automation,” \$3,000, Co-Investigator (with B. Hannaford and R. Albrecht), funded, Sept. 1993-June 1994.

Washington State Department of Transportation, “Applications of Neural Network Control Technology to Transportation,” \$75,000, PI, funded, July 1993-Dec. 1994.

UW Royalty Research Fund, “Quick, Precise Minipositioner with Tools for Manipulating Drops of Reagents and DNA Samples,” \$27,000, PI, funded, Sept. 1993-Dec. 1994.

Washington Technology Center, “The World's First Gyroplane Instrument,” \$75,000, PI, funded, July 1993-Mar. 1995.

Washington Technology Center, “Automated Fluid Sample Handling for Genome Analysis,” \$140,000, PI, funded, July 1993-June 1995.

NASA In-Step Program, “Micro-Telerobotics Experiment: Micro-TREX,” \$60,000, Co-Investigator (Blake Hannaford, PI), funded, June 1994-Feb. 1995.

US Department of Transportation TransNow, “On-Line Implementation of a Fuzzy Neural Ramp Metering Algorithm for the Seattle Freeway System,” \$80,500, PI, funded, Sept. 1994-Aug. 1995.

US Department of Transportation TransNow, “On-Line Implementation of a Fuzzy Neural Ramp Metering Algorithm for the Seattle Freeway System: Phase II,” \$138,000, funded, Sept. 1995-June 1997.

Washington Technology Center, “Automated Fluid Sample Handling for Genome Analysis II,” \$110,000, PI, funded, July 1995-June 1997.

NIH National Human Genome Research Institute, 1 K01 HG00013, Special Emphasis Research Career Award, “Automation of Steps in Large-Scale DNA Sequencing,” \$487,000, PI, funded, Sept. 1993-August 1998 (no-cost extension through November 2000).

US Department of Transportation TransNow, “On-Line Implementation of a Fuzzy Ramp Metering Algorithm for the Seattle Freeway System: Software Modification, Fuzzy Controller Testing, and Full-scale Expansion,” \$190,308, PI, funded, Sept. 1997-Aug. 1999; \$25,000 supplement awarded through November 1999; \$25,000 supplement awarded through January 2000.

NIH National Human Genome Research Institute, 1 R01 HG01497, “Capillary Automated Submicroliter Sample Preparation,” \$2,637,490 (direct), PI, funded, May 1997-April 2002 (two year extension of \$1.4 million was added for Presidential Early Career Award).

NIH National Cancer Institute, 1 R33 CA84691, “Automated Minimal Residual Disease Quantification,” \$1,700,775 (direct), \$2,170,590 (with indirect), PI, funded, 06/01/00 - 06/30/05.

UW/PNNL (DOE) Joint Institute of Nanotechnology Postgraduate Fellowship (D. Meldrum, PI, advisor), “Development of cellular absorptive tracers (CATs) for Quantitative characterization of the complexity of nanoscale biological systems,” \$42,598, PI, funded, 01/01/04-09/30/05.

NIH National Human Genome Research Institute, 5 P50 HG002360, “CEGSTech: Integrated Biologically-Active Microsystems,” \$11,500,326 (direct), \$15,710,767 (with indirect), PI (with co-PI M. Lidstrom and investigators K. Bohringer, L. Burgess, B. Cookson, N. Dovichi, M. Holl, B. Marquardt, J. Mittler, J. Mullins, B. Reid, V. Vogel, and D. Wilson), funded, 8/1/01 – 7/31/06. Supplement of \$1,620,471 (direct), \$2,230,097 (with indirect) added for GenOM, Genome Outreach to Minorities. Supplement of \$100,000 (direct) added for upgrade of Laser Scanning Confocal Microscope to the Meta model.

NIH National Cancer Institute, 1 R21/R33 CA112149, “Automated Cell Preparation in Tubes for 3D Microscopy,” \$200,000, PI, funded, 04/01/05-3/31/07.

National Academies Keck *Futures Initiative*, NAKFI Geno04, “Role of Nitric Oxide on White Blood Cell Function in Inflammation and Infection,” \$60,000 (direct), \$75,000 (with indirect), PI, (with investigator Dr. Debra Weiner, Harvard Medical School), funded, 05/01/2006 – 08/30/2008.

NIH National Institutes of General Medical Sciences, 1 R01 GM068878, “High-Throughput, Capillary-Based Protein Crystallography,” \$749,746 (direct), \$1,061,532 (with indirect), PI, funded, 09/01/03-08/31/08.

NIH National Human Genome Research Institute, 1 R24 HG02215, “Advanced Develop/Test ACAPELLA Automated Sample Handler,” \$6,833,300 (direct), \$8,196,216 (with indirect), PI, funded, 6/1/00-9/30/07 [no-cost extension to 9/30/08].

Science Foundation Arizona and British Petroleum, “Cyanobacteria for Generating Solar-Powered, Carbon-Neutral, and Cost-Effective Biodiesel,” \$4.5M (with indirects), Investigators: N. Woodbury, W. Vermaas, B. Rittman, R. Curtiss, R. Roberson, and D. Meldrum, funded, 08/01/07– 07/30/09.

NIH National Human Genome Research Institute, 2 R01 HG01497, “Microscale Instrument Development for Genomic Analysis,” \$2,769,690 (direct), \$4,998,712 (with indirect), PI. 05/01/02 - 9/30/10.

## Graduate Students

### Chaired Doctoral Degrees

Student Name	Dissertation Title	Date
Ling-Sheng Jang (ME)	Acoustic Microfluidic Mixing	08/03
Euphoria Gibbons (Chem)	DNA Sequencing with No Net Migration	08/05
Patrick Ngatchou 08/06	Intelligent Techniques for Modeling and Optimization	
John Koschwanez	Tools for Automated Lifetime Analysis of a Single Yeast Cell	12/06
Pahnit Seriburi	Using Electric Cell-Substrate Impedance Sensing (ECIS) to Measure Properties of an Individual Adherent Cell	06/08
Samuel Kim	Integrated Fluorescence Detection System	06/08
Wandaliz Torres-Garcia	Integrative Analysis of Transcriptomic and Proteomic Data of <i>Desulfovibrio vulgaris</i> : a Nonlinear Approach	06/11
Vivek Nandakumar	Image Analysis of Single Cells for Early Cancer Detection (post-quals)	08/11
Saeed Adil Merza	Cell Harvesting for Single Cell Analyses	TBD
Xu Shi	Genomic Analyses of Microbes in the Deep Ocean	TBD
Jieying Wu	Single Cell Analyses Technologies for Analyzing Microbes in the Oceans	TBD
Tathagata Ray	Microfabrication of High-Throughput Devices for Single-Cell and Cell-Cell Experiments	TBD
Jia Zeng	Cell-cell Interaction in Esophageal Cancer	TBD
Bo Wang	Metabolic Engineering of Cyanobacteria for Biofuel Production	TBD
Matthew Dunn	DNA Origami	TBD

**Chaired Masters Degrees**

<b>Student Name</b>	<b>Thesis Title</b>	<b>Date</b>
Emerson C. Tongco	Optimal Sensor Placement and Active Vibration Suppression of Flexible Space Structures	12/93
Janet Bartlett	Minimum Time Control of Nonlinear Systems Using Neural Networks	12/93
Cynthia E. Taylor	Freeway Traffic Data Prediction Using Artificial Neural Networks	03/94
Robert Emery	(coursework only)	03/94
Carlos Garcia-Moreno	(coursework only)	03/94
Steve Evers	Microcapillary Fluid Meniscus Sensing (project)	08/94
Marco Daoura	Control of Fluid Volumes Inside Glass Capillaries Using Optical Sensors	06/96
Tom Jackson	Pairwise Alignments of DNA-Sequencer Signals: Signal Normalization and Structural Pattern Recognition	08/96
Brook Assefa	Application of Geometric Dynamical Systems Theory to Robot Manipulator Design	12/96
Neal Friedman	Capillary Tube Resistive Thermal Cycling	03/97
Lauren Sjoboen	Piezo Actuated Reagent Dispenser with Integral Pressure Sensor	12/97
Ethan Arutunian	A Software Architecture Integrating User Interface and Machine Control in Laboratory Automation	12/98
Michael S. Hellen	(coursework only --- Boeing student)	06/98
Wei Hai	DNA Quantitation by UV Absorption in Glass Capillaries	12/98
Shane Crippen	Microanalytical System for Dielectrophoresis Studies of Biological Macromolecules	12/99
Tami Erickson	(coursework only)	12/00
Turgut Kosar (BioE)	Synchronization of Bacterial Cultures in a Microsystem	03/02
Molly Kidd	Closed-Loop Aspiration of Submicroliter Fluid Volumes in Glass Capillaries	06/02
Brian Rabkin (BioE)	Discrete Isoelectric Fractionation: The Fractionation of Proteins In Free Solution by Discrete pH Intervals	08/02
Xin Lei	Automated DNA Sequencing Reaction Purification	06/03

Deirdre R. Meldrum		05/10/11
Jianchan Dong	Real-time Quantitative Thermal Cycling Instrumentation	12/03
John Koschwanez	Automation of Yeast Pedigree Analysis	08/04
Timothy Molter	Automation of Single Cell Oxygen Consumption Experiments	06/06
Patrick McVittie	An Automated Hybrid Two-Dimensional Electrophoresis System For Single-Cell Analysis	12/06
Tyler Powell	Quantitative Unmixing of Multiple Fluorescent Signals	12/06
Brandon Karlsgodt	The Development of a Multispectral Imaging Platform for Biological Experimentation	12/06
Joseph Peach	Design and Operation of Microscale Thermocyclers and Temperature Controllers: Focus on PCR Applications	03/07
Michelle Entezari	PDMS Technology Development for Experiments to Study Aging and Differentiation of Hematopoietic Stem Cells	06/07
Clement Sun	Spectroscopy for Single Cell Analyses	06/08
Tariq Shaikh	Microscale Genomics	12/08
Matthew Banister	Single Cell Imaging Using Confocal Scanning Microscopy [with Professor Liu in Computer Science at ASU]	06/09
Tathagata Ray	Microfabrication Methodologies for Multiparameter Sensing	08/09
Liang-I Ling	Microfabrication-Free PCR Chip Array Towards Single-Cell Analysis	08/09
Shivani Bhushan	Microfabrication of Single Cell Analyses Systems	02/10
Jesse Clayton	Polymer Encapsulation for Deep Sea Pressure-Sensitive Instruments	04/10
Szu-Yu Chen	Microfluidic Devices for Analyzing Microbes in the Oceans	06/10
Adam Dengler	Design and Fabrication of DNA Nanoarrays	06/10
Wenjie Zhang	Optimizing Micro-Vortex Chamber for Living Single Cell Rotation	05/11
John Johansen	Optical Undersea Communications	TBD
Aurelie Lecluse	Sampling of Ocean Samples <i>in situ</i> for Genomic Analyses	TBD
Iniyana Soundappa Elango	Microfluidic Electrocage for Precise Rotation of Single, Live Biological Cells	TBD
Venkataramanan Kuppaswamy	Programming for Lab Automation Controls and Data Acquisition	TBD

**Supervision of Undergraduate Independent Study**

<b>Student Name</b>	<b>Project Title</b>	<b>Date</b>
Jonathan Park	RPV Project	Wi1993
Jonathan Park	Global Positioning System	Sp1993
Todd Stedman	Interactions between Hardware, Software and Biology	Fa1995
Curtis Anderson	Design and Control of Microtiter Plate Station	Wi1996
Virginie Mouton	Visual C++ for the Genomation Laboratory (visiting student from France)	Su1996
Joel Reiter	Genome Automation (gel loading) (Mr. Reiter received a Mary Gates Fellowship for undergraduate research with me Winter/Spring 1997)	Su1996- Sp1998
Alvaro Erickson	SIR-1 Robot Controller Interface and Software	Su1997
John Fortner	SIR-1 Servo Controller Boards and Integration	Su1997
Brett Osada	SIR-1 Robot Software Library Implementation	Fa1997 Wi1998
Robert Smythe	SIR-1 Control Systems Design and Integration	Fa1997 Wi1998
Mark Borden (ASU)	Surface Chemistry Experiments for Acapella	Su1998
Eric Dixon	Capillary Gel Loading	Su1998- Sp1999
Vitaliy Mosesov	High-Throughput Experiments on Acapella Automated Reagent Reservoir for Reagent Dispensers Testing of Acapella-5K	Su1998 through Fa2000
Si Truong	Detector for Scanditronix System in Radiation Oncology	Wi1999
Tod Kershaw	Linear Generator with Frequency Optimization Control System for Electric Cars	Wi1999 Sp1999
Mark Borden (ASU)	Purification Optimization and Bioreactor Design	Su1999
Yasmine Srouji (PSU)	Microfabrication Design	Su1999
Justin Snapp (Lakeside High School)	Experiments on Acapella 5K Piezoelectric Dispenser Diagnostics (to Stanford for school)	Su1999 Su2000
Jay Yedinak	Automated Gel Loading	Wi2000 Sp2000
Seema Ghosh	Experiments on Real-time Quantitative Thermal Cycling	Wi2001

Deirdre R. Meldrum		05/10/11
Jeff Walters	Tests of Piezoelectric Sensors for Acapella-5K	Wi2001
Tim Ren	Software Development for Real-Time Quantitative Thermal Cycling Software for Genomation Lab projects	Wi2001- Wi2003
Matt Stanton	Microscale System for Automating Biopsy Preparation (visiting from Princeton University)	Su2002
Michael Wang	Laser Scanning Confocal Microscope with Commercial Environmental Control (MLSC undergrad fellowship)	Su2002- Su2004
Andrew Miller	MEMS System for Automating Tissue Sample Biopsies (MLSC undergraduate fellowship; NASA Space Grant Scholar)	Su2002- present
Kendan Jones-Isaac	Biochemistry for ACAPELLA-5K and MRD (BRIDGES minority student) (GenOM Outreach to Minorities Fellowship)	Su2002- Sp2004
Kendan Jones-Isaac	Single Cell Macrophage Experiments for the MLSC (GenOM Outreach to Minorities Fellowship) (NIH Research Fellow 2005-2006)	Fa2004- Su2005
Tracy Fung	Experiments on the Laser Scanning Confocal Microscope and Adhesion of Yeast Using Microprinting with con-A; Single cell experiments for the MLSC (MLSC undergraduate fellow)	Sp2002- Sp2005
Tracy Fung	SURP (Summer Undergraduate Research Program) Fellow NASA Space Grant	Su2005
Tracy Fung	Liquid Crystal Temperature Sensor for Microfluidic Devices (to Stanford for Ph.D.)	Fa2005- Sp2006
Ellen Griffin	Electronics for the Genomation Lab  Real-time Quantitative PCR	Fa2003- Su 2004 Sp2005
Jen Phipps	Micromolding PDMS Valves for Microsystems	Sp2004
Neha Auluck	Acoustic Trapping of Particles and Cells and Micromolding	Sp2004- Su2005
Shile Zhang	Single Cell Macrophage Experiments for the MLSC	Sp2005- Wi2006
James Wolfe	SURP (Summer Undergraduate Research Program) Fellow NASA Space Grant	Su2005
Kathryn Winglee	SURP (Summer Undergraduate Research Program) Fellow NASA Space Grant	Su2005
Kathryn Winglee	Microfluidic System for q-RT-PCR	Fa2005- Su2006
Jeffrey Houkal	Protein Crystallography Automation	Fa2005- Su2006

Deirdre R. Meldrum		05/10/11
Brian Wolfe	Soft Lithography for Single Cell Analyses	Fa2005- Su2006
Vivek Patel	Tubes-in-the-Desert	01/07 - 09/08
Julio Munoz	Machining	01/07 - 10/07
Jonathon Grover	Microscopy and Sensors	04/07 - 06/08
John Johansen	Microscale Genomics	05/08 - 08/09
Andrew Holle	Microscale Genomics for the Oceans	05/07 - 10/08
Zina Alam	Microscale Life Sciences	05/07 - 11/08
Adrianna Cate	Computer-Assisted Design of Microfluidic Devices	05/07- present
Richard Davis	PCR Experiments for Microscale Life Sciences	06/07 - 01/08
Rebecca Hui	Summer Intern on Tubes-in-the-Desert [high school student]	06/07 - 08/09
Robert Conner	Automation	09/07 - 07/08
Daniel DeMichele	Tubes-in-the-Desert	12/07 - 06/08
Chandra Goff	Fabrication of Microfluidic Funnels and Bead-Packed Filters	01/08 - 09/09
HansaThompson	Targeted Delivery of Block Copolymers for Cell Imaging	02/08 - 12/10
John Hernandez	Machining	03/08 - 06/08
Benjamin Speck	Tubes-in-the-Desert	04/08 - 09/09
Nicole Syed	Tubes-in-the-Desert	04/08 - 09/09
Margaret Dankert	Tubes-in-the-Desert	04/08 - 09/09

Deirdre R. Meldrum		05/10/11
Maithily Kohale	Microfabrication	05/08 - 09/08
Sudarshan Krishnan	Tubes-in-the-Desert	05/08 - 09/08
Amy Zou	Tubes-in-the-Desert (high school intern)	06/08 - 08/08
Thomas McCarty	Tubes-in-the-Desert	07/08 - 09/09
Jesse Clayton	Development of Optical Sensors	08/08 - 08/09
Jessica Forrester	PCR and Cell Loading	08/08 - 03/10
Jaya Singh	Cell Synchronization	09/08 - 03/10
Bradley Shumway	Sensors for Single Cell Analyses	09/08 - 09/09
Wenjie Zhang	Microfluidic Device Characterization	09/08 - 09/10
Jakrey Myers	Automated Cell Loading and Sensors	11/08 - present
Aida Mohammadreza	Automated Cell Loading	12/08 - present
Courtney Hemphill	PCR and Cell Culturing	01/09 - 09/09
Warner Weber	pH Sensor Development	01/09 - 08/09
Jane Lacson	Cell Culturing	02/09 - 10/10
Jordan Yaron	Web site Development for the Center for Ecogenomics Cytotoxicity and Optical Cell Stress	04/09 - present
Raisa Ahmad	Technology to Separate Mixture of Microbial Community	03/09 - present
Joseph Butler	Underwater Sensor Deployment	11/09 - 05/11
Andrew Shabilla	Potomac Laser Manufacturing (high school volunteer)	07/09 - present
Kelly Lintecum	Cell Prep and Staining for 3D Tomography	08/09 - present

Deirdre R. Meldrum		05/10/11
David Ganger	Low Power Optical Communications	09/09 - present
Matthew Dunn	Single-Cell Microvortex Rotation	11/09 - present
Ashok Kumar	Cell Culture Manipulation	12/09 - present
Ruhaniyah Alam	Cell Manipulation and Micelle-Based Drug Delivery	01/10 - present
Kathryn Hernandez	Cell Prep and Staining for 3D Tomography	03/10 - present
Kristen Lee	Cell Loading	03/10 - present
Abhishek Dharan	Microfabrication	05/10 - present
Tanner Waggoner	Genetically Engineering Microbes to Produce Butanol (high school intern)	05/10 - 08/10
Linh Tran	Genetically Engineering Microbes to Produce Butanol (high school intern)	06/10 - 08/10
Dena Navorroli	On-Chip Microcultivation (high school intern)	06/10 - 08/10
Emily Fuller	Sensor Characterization	06/10 - present
Elliot Drown	Cell Loading and Programming	07/10 - present
Shuang Hu	Device Development	08/10 - 01/11

**Other Significant Supervision**

**Research Assistant Professor**

<b>Name</b>	<b>Project Title</b>	<b>Date</b>
Mark Holl, Ph.D.	Microfabrication and Microfluidics for Genome Analysis	07/01 - 12/06
Joseph Chao, Ph.D.	Digital Microscopy and Novel Microfluidics for Cell Analyses	01/07 - present
Laimis Kelbauskas, Ph.D.	Optical Sensors and Imaging for the MLSC	03/10 - present
A. Cody Youngbull, Ph.D.	Imaging (two-photon +), Device Development and Robotics	07/10 - present

Deirdre R. Meldrum		05/10/11
Yanqing Tian, Ph.D.	Chemistry for Design and Development of Optical Sensors	03/11-present
<b>Research Associate Professor</b>		
<b>Name</b>	<b>Project Title</b>	<b>Date</b>
Weiwen Zhang, Ph.D.	Microbiology for Ecogenomics	07/07-present
<b>Research Engineer (Professional Staff)</b>		
<b>Name</b>	<b>Project Title</b>	<b>Date</b>
Cynthia E. Taylor, M.S.	Fuzzy Logic Ramp Metering Control Design and Implementation for the Seattle Freeway	07/94 - 02/00
Mark Holl, Ph.D.	Microfabrication and Microfluidics for Genome Analysis	08/99 - 06/01
Matthew Moore, M.S.	Software Development for Genomation: User-Interface, Machine Control, Imaging, Web Design	03/00 - 05/01
Jennifer Jaiteh (75%)	Systems Administrator for Computing	10/02 - 12/06
Timothy Ren, B.S.	Software Engineering for Genomation Systems	01/03 - 07/06
Sarah McQuaide	Microfabrication Engineer for Microscale Life Sciences	01/03 - 12/06
Shawn McGuire	Electromechanical Engineer for Protein Crystallography and Automated Sample Preparation	08/03 - 12/06
Steven Gales	Software Engineering for Genomation Systems	09/04 - 12/06
Roger Johnson, Ph.D.	Laboratory Manager and Optical Engineer	11/06 - 10/09
Haixin Zhu, Ph.D.	Microscale Systems for Single Cell Analyses	06/07 - present
Darryl Cox	Automation Electronics	11/07 - 02/09
Raymond Mammola	Software Engineering	08/07 - 09/08
Rhett Martineau	Tubes-in-the-Desert	08/07 - 09/09
Sindhuja Sadayandi	Tubes-in-the-Desert – Programming	05/08 - 09/09
Sindhuja Sadayandi	Automation of Serum Processing for Mass Spectrometry	09/09 - 06/10

Deirdre R. Meldrum 05/10/11

Dean Smith Software Engineering 01/09 - present

Michael Hupp Automation Electronics 05/09 - present

**Research Associate (Post-Doc)**

**Name Project Title Date**

Harold Evensen, Ph.D. Genome Automation 07/96 - 06/99

Joseph Chao, Ph.D. Microscale Life Sciences – Living Cellular Array Scanner 06/02 - 12/06

Barry Lutz, Ph.D. Microscale Life Sciences – Acoustic Trapping of Cells (worked at Intel; now at UW Department of Bioengineering) 02/04 - 07/06

Diego Barrettino, Ph.D. Microscale Life Sciences – CMOS Integrated Systems 04/04 - 08/05

Jaeyoung Choi, Ph.D. UW/PNNL Fellow – Cellular Absorptive Tracers 03/04 - 09/05

Yasser Anis, Ph.D. Automation of Single Cell Loading into Microchips 08/07 - 09/09

Shashanka Ashili, Ph.D. Sensor Calibration for Single Cell Analyses Systems 09/08 - 03/10

Xianfeng Zhou, Ph.D. Optical Potassium Ion Sensor Synthesis 07/09 - present

Qian Mei, Ph.D. Chip-Based Separation for Single-Cell Proteomics 01/10 - present

Thai Tran, Ph.D. Biology for Single Cell Analysis 01/11 - present

**Research Technician**

**Name Project Title Date**

Courtney Hemphill Cell and Tissue Culture 09/09 - 07/10

Bradley Shumway Thin Film Biosensor Validation and Calibration 09/09 - 05/10

**Assistant Research Professional (Professional Staff)**

**Name Project Title Date**

Grace Doblas Tubes-in-the-Desert 12/07 - 05/08

Swathi Sridharakrishnan Tubes-in-the-Desert 06/08 - 09/09

Deirdre R. Meldrum

05/10/11

**Assistant Research Technologist (Professional Staff)**

<b>Name</b>	<b>Project Title</b>	<b>Date</b>
Yuguang Jin	Lab Management for the NEPTUNE Project	01/07 - present
Timothy Wadlington	Tubes-in-the-Desert	04/08 - 08/08
Daniel Bank	Tubes-in-the-Desert	04/08 - 09/09
Daniel Bank	Automation of Serum Processing for Mass Spectrometry	09/09 - 06/10

**Associate Research Technologist (Professional Staff)**

<b>Name</b>	<b>Project Title</b>	<b>Date</b>
Greg Bessette	Tubes-in-the-Desert	03/08 - 10/08
Jesse Lynch	Tubes-in-the-Desert Extraction	05/08 - 09/09
Juan Vela	Tubes-in-the-Desert	04/08 - 09/09
Juan Vela	Tubes-in-the-Desert	09/09 - present
Patti Senechal-Willis	Microscale Life Sciences Center: Cell Preparation and Handling	01/10 - present

**Assistant Research Scientist (Professional Staff)**

<b>Name</b>	<b>Project Title</b>	<b>Date</b>
Weimin Gao, Ph.D.	Single Cell Transcriptomics of Microbes in the Oceans	01/08 - 11/09
Yasser Anis, Ph.D.	Automation of single cell loading and harvesting into Microchips	09/09 - 05/10
Shashanka Ashili, PhD	Sensor Calibration for Single Cell Analyses Systems	03/10 - present
Jiangxin Wang, Ph.D.	Microscale Life Sciences Center	06/10 - present

**Associate Research Scientist (Professional Staff)**

<b>Name</b>	<b>Project Title</b>	<b>Date</b>
Yongzhong Li, Ph.D.	Cell Biology for Biomedical Applications	07/07 - 10/09

Deirdre R. Meldrum		05/10/11
Laimis Kelbauskas, Ph.D.	Optical Sensors and Imaging for the MLSC	09/07 - 03/10
A. Cody Youngbull, Ph.D.	Imaging, Materials Science and Sensors	01/08 - 07/10
Fengyu Su, Ph.D.	Microfabrication and Microscopy	03/09 - present
Weimin Gao, Ph.D.	Single Cell Transcriptomics of Microbes in the Oceans	11/09 - present
Honor Glenn, Ph.D.	Cell Imaging	07/10 - present
<b>Research Scientist (Professional Staff)</b>		
<b>Name</b>	<b>Project Title</b>	<b>Date</b>
Mohan Saini, Ph.D.	Biochemistry: Reducing Reaction Volumes, Protocol Optimization, New Experiment Design	09/98 - 12/06
Charles Fisher, Ph.D.	Optics and Electronics for Genome Instrumentation	01/00 - 12/06
Robert Carlson, Ph.D.	Microscale Life Sciences and Proteomics	04/03 - 12/04
Mark Holl, Ph.D.	Integrated Microscale Systems for Life Sciences (ASU) Tubes-in-the-Desert – Rooftop Photobioreactor	01/07 - present
Yanqing Tian, Ph.D.	Chemistry for Design and Development of Optical Sensors	10/08 - 03/11
Roger H. Johnson, Ph.D.	Cell Imaging	10/09 - present
<b>Senior Research Scientist (Professional Staff)</b>		
<b>Name</b>	<b>Project Title</b>	<b>Date</b>
Robert Carlson, Ph.D.	Microscale Life Sciences and Proteomics	01/05 - 04/07
<b>Visiting Scientists</b>		
<b>Name</b>	<b>Project Title</b>	<b>Date</b>
Jean Peccoud, Ph.D.	Statistics of Real-Time Quantitation for PCR (from INSERM, Grenoble, France)	01/98 - 12/99
Michel Cuendet, M.S.	Analysis and Estimation of Estimator for Real-Time Quantitative PCR (from Univ. of Lausanne, Switzerland)	07/00 - 10/00
Stephen Phillips, Ph.D.	Microscale Life Sciences (from Case Western Reserve University, now at ASU)	08/02 - 01/03
Elena Martin, Ph.D.	Thermal and Microfluidic Modeling (from Spain)	07/04 - 08/05

Deirdre R. Meldrum		05/10/11
Robin Luo, Ph.D.	Ion channel Microsystems (from National Cheng Kung University, Taiwan)	06/05 - 08/05
Aurelie Lecluse	Automated Cell Loading (from Paris, France)	02/09 - 08/09
<b>Visiting Scholars</b>		
<b>Name</b>	<b>Project Title</b>	<b>Date</b>
Tanasak Kaewsomboon	Chip Single-Cell PCR	05/10 - 07/10
Porpin Pungetmongkol	Microfabrication	05/10 - 07/10
<b>Electro-Mechanical Engineer</b>		
<b>Name</b>	<b>Project Title</b>	<b>Date</b>
Aaron Torok	Test Acapella-5K and Genomation Lab Support	04/00 - 10/00
Andrew Cookson	Test Acapella-5K and Genomation Lab Support	01/01 - 03/03
Jeff Houkal	Microscale Devices for Genomics University of Washington Arizona State University	01/05 - 12/06 01/07 - present
<b>Program Manager</b>		
<b>Name</b>	<b>Project Title</b>	<b>Date</b>
Karen Fisher	Acapella-5K Advanced Development Microscale Life Sciences Center	02/00 - 12/06
<b>Laboratory Business Manager</b>		
<b>Name</b>	<b>Project Title</b>	<b>Date</b>
Lisa Alexander	Center for Biosignatures Discovery Automation	05/07 - present
<b>Office Assistant</b>		
<b>Name</b>	<b>Project Title</b>	<b>Date</b>
Kristina Gonzalez	Center for Biosignatures Discovery Automation	08/08 - present

## Teaching

### Undergraduate and Graduate Courses Taught

Year	Qtr	Course	Brief Title	Credits	# Students
1993	Win.	EE543	Introduction to Robotics	4	12
1993	Spr.	EE/AA549	Identification and Estimation	3	20
1994	Spr.	EE/AA549	Identification and Estimation	3	11
1994	Aut.	EE446	Control Systems I	4	9
1996	Spr.	EE341	Discrete Time Linear Systems	5	44
1997	Win.	EE/AA448	Control Sensors and Actuators	3	30
1998	Win.	EE/AA448	Control Sensors and Actuators	3	26
1999	Aut.	ENGR100sect	Introduction to Engineering Design	5	3
1999	Win.	EE/AA448	Control Sensors and Actuators	3	40
1999	Spr.	EE/AA449	Controls Capstone Design Course	3	18
2000	Spr.	EE544	Advanced Robot Manipulators	4	5
2000	Aut.	ENGR100sect	Introduction to Engineering Design	5	3
2001	Aut.	EE215	Fundamentals of Electrical Engineering	4	125
2002	Win.	EE500N	Graduate Seminar – Microscale Life Sciences	1	36
2002	Win.	EE500N	Graduate Seminar – Microscale Life Sciences	1	36
2002	Aut.	EE299b	Secret Life of the Electron	4	8
2003	Win.	EE546	Biology and Genomics for Engineers	3	19
2004	Win.	EE546B	Biology and Genomics for Engineers	3	8
		EE400M	Biology and Genomics for Engineers	3	4
2005	Win.	EE546B	Biology and Genomics for Engineers	3	16
2005	Win.	EE400B	Biology and Genomics for Engineers	3	7
2006	Win.	EE546A	Biology and Genomics for Engineers	3	10
2006	Win.	EE400A	Biology and Genomics for Engineers	3	4

### Invited Lectures and Seminars (nearly 200)

Georgia Institute of Technology, Department of Mechanical Engineering/Invited Seminar, “Direct Model Reference Adaptive Control of a Flexible Robotic Manipulator,” Nov. 1985.

University of Washington, College of Engineering Control Systems Seminar, “Indirect Adaptive Control of a Two-Armed Free-Flying Robot,” Nov. 1991.

Zonta International Foundation Invited Speaker, Berkeley, California, “Control of a Two-Armed Free-Flying Robot,” Oct. 1991.

Universita Di Napoli, Dipartimento Di Informatica E Sistemistica Invited Seminar, “Indirect Adaptive Control of a Two-Armed Free-Flying Robot,” July 1992.

University of Washington, College of Engineering Control Systems Seminar, “New Research Directions in Robotics, Flexible Structures, and Transportation,” Oct. 1992.

Shoreline Community College, Department of Mathematics, Invited Speaker for WIE, “Why Engineering?” Nov. 1992.

University of Washington, Department of Elec. Engr. BioRobotics Seminar, “Robotics and the Human Genome Project,” Dec. 1992.

North Seattle Community College, Women in Science and Engineering, “What to Expect: The Engineering Education Experience,” Dec. 1992.

Washington Technology Center Advisory Board, Seattle, WA, "The World's First Gyroplane Instrument," Oct. 1993.

Washington Technology Center and Governor Lowry, Seattle, WA, demo and discussion on sample handling genome automation research, Oct. 27, 1993.

Washington State Department of Transportation, Olympia, WA, "Predicting Freeway Traffic Data Using Artificial Neural Networks," Nov. 9, 1993.

Society of Women Engineers, Evening with Industry, Keynote Speaker, Seattle, "T-H-I-N-K," Jan. 1994.

Washington Technology Center Advisory Board, Seattle, WA, "Automated Fluid Sample Handling for Genome Analysis," Apr. 1994.

University of Washington, Department of Chemistry, interviewed by Women in Science students in CHEM 140, CHEM 141, Gen. Studies 101, Nov. 9, 1993.

Washington State Department of Transportation and FHWA, Seattle, WA, "Freeway Traffic Data Prediction Using Artificial Neural Networks and Development of a Fuzzy Logic Ramp Metering Algorithm," June 21, 1994.

University of Washington, New Student Orientation, presentation on "Studying Math and Science," July 25, 1994.

University of Washington, College of Engineering Control Systems Seminar, "Genome Automation," Oct. 19, 1994.

University of Washington, Freshman Interest Group, General Studies 199, Oct. 28, 1994.

University of Washington, Elec. Engr. Corporate Professional Advisory Board, "NSF ERC Proposal on Center for Applied Mechatronics in Biological Systems (CAMBIOS)," Jan. 12, 1995.

Women in Science and Engineering Conference, Panel on "Graduate Studies and an Academic Career," Apr. 8, 1995.

University of Washington, Electrical Engineering Corporate Day, "Improving the Speed and Precision of Automation for DNA Sequencing," April 27, 1995.

University of Washington, Dept. of Molecular Biotechnology, DOE Site Visit, "Automated Sample Handler for Genome Analysis," (poster and hardware demo), June 15, 1995.

Washington Technology Center, Technical Advisory Board, "Automated Fluid Sample Handling for Genome Analysis," Nov. 30, 1995.

University of Washington, Dept. of Electrical Engineering, Graduate Student Seminar, "Research in the Genomation Laboratory," Jan. 24, 1996.

Sequana Therapeutics, La Jolla, California, "Automated Restriction Enzyme Digest and PCR Analysis in Glass Capillaries," Mar. 18, 1996.

University of Washington Molecular Biotechnology Integrated Science Partners Middle School Outreach Summer School, "Genome Automation in the Genomation Laboratory," July 1996.

TransNow, presentation to Dr. Sharma, RSPA Administrator, USDOT, "A Fuzzy Controller to Meter Freeway OnRamps," (with Cynthia Taylor), July 30, 1996.

National Institutes of Health Human Genome Lecture Series, "Capillary Automated Submicroliter Sample Preparation," Bethesda, Maryland, February 27, 1997.

Women in Engineering Freshman Recruiting Luncheon, "Automation for the Human Genome Project," Apr. 9, 1997.

University of Idaho Honors Convocation Public Lecture, "Acapella, DNA Sequencing Without Accompaniment," Apr. 17, 1997.

University of Idaho Honors Convocation Keynote Address, "Continuity and the Cutting Edge," Apr. 18, 1997.

Department of Energy, presentation on genome automation for the DOE Genome Director, Apr. 21, 1997.

Washington University Genome Science and Technology Center, "Genome Analysis inside of Glass Capillaries," Apr. 28, 1997.

Boehringer Mannheim, Concord, California, "Genome Technologies Utilizing Glass Capillaries," May 5, 1997.

Millennium Pharmaceuticals, Cambridge, Mass., "Acapella," May 13, 1997.

University of Washington, Robotics and Controls Colloquium, "Acapella: Automated Fluid Sample Handling for DNA Sequencing," May 30, 1997.

Zonta International Amelia Earhart Foundation, "Biotechnology Laboratory Automation," October 10, 1997.

University of Wisconsin, Department of Chemistry, "Challenges of Submicroliter Fluid Sample Preparation for Genome Analysis," October 16, 1997.

University of Washington Genome Center, "Update on Acapella 1k," November 4, 1997.

University of Washington, Department of Electrical Engineering, Graduate Student Seminar, "Interdisciplinary Research in the Genomation Laboratory," November 7, 1997.

University of Washington, Department of Bioengineering, Guest Lecture in BioE 599J, Microfabrication for Bioengineering Applications, "Genome Automation and Challenges for Microtechnology," November 17, 1997.

National Institutes of Health Symposium on Bioengineering Research: Building the Future of Biology and Medicine, invited as panelist to discuss challenges presented by Leroy Hood in his plenary lecture on "Functional Genomics, from Genome to Physiome," February 27-28, 1998.

UW College of Engineering Alumni Event in Los Angeles, "Automating Genome Analysis to Sequence the Human Genome by the Year 2005," March 5, 1998.

Cold Spring Harbor Laboratory, New York, Advanced Genome Sequence Analysis Course, invited lecturer on "Genome Automation: Acapella and Other New Technologies," March 30, 1998.

UW Engineering Alumni Association and the College of Engineering, invited panelist (with Leroy Hood, Bruce Carter, and Buddy Ratner) on "The Future of Biotechnology," May 19, 1998.

UW Department of Chemistry, "Acapella: Automating Submicroliter Fluid Sample Preparation for Genome Analysis," October 19, 1998.

Institute for the Academic Advancement of Youth, Johns Hopkins University, invited member of Academic Panel at University of Puget Sound, Tacoma, WA, November 14, 1998.

University of Alberta, Department of Chemistry, "Acapella: An Automated Fluid Sample Handling System for Genome Analysis," December 4, 1998.

UW Women in Science and Engineering Panel on Successful Proposal Writing and Execution, April 1999.

UW College of Engineering, presentation to potential donor Mr. William C. W. Huang, "Automated Fluid Sample Handling for Genome Analysis," May 27, 1999.

Laboratory Robotics Interest Group, Northwest Chapter, "Automation in the Genomation Laboratory at the University of Washington," June 27, 2000.

National Institutes of Health, National Cancer Institute, Innovative Technologies PI Meeting, "Advances in DNA Technology," July 8, 2000.

University of Washington Science Forum, "Life-on-a-Chip," May 3, 2002.

International Society of Analytical Cytology XXI International Congress, Plenary, "Cytometric Microsystems for Eukaryotes and Prokaryotes," San Diego, California, May 3-9, 2002.

IEEE International Symposium on Circuits and Systems 2002, Plenary, "Life-on-a-chip," Scottsdale, Arizona, May 26-29, 2002.

University of Washington Genome Center, "Acapella-5K," June 10, 2002.

Genoptix, "Microsystems for Analyzing Cells," San Diego, CA, July 26, 2002.

University of Washington, College of Engineering Executive Committee, "Microscale Life Sciences Center," August 7, 2002.

University of Washington Dinner Series, "What's next in the Human Genome race?" hosted by Chris Larson and Julia Calhoun, September 23, 2002.

University of Washington, "Microscale Lifes Sciences Center (NIH) – Introduction and Overview," for the first annual Scientific Advisory Board of our NIH CEGS MLSC, November 1, 2002.

National Institutes of Health, National Human Genome Research Institute planning meeting, "Beyond the Beginning: The Future of Genomics II," Airlie Center, Warrenton, Virginia, November 18-20, 2002.

University of Washington, Department of Electrical Engineering Colloquium, "What Does Electrical Engineering have to do with Genomics?" December 10, 2002.

University of Washington, Department of Biochemistry, NIH NIGMS Site Visit for the Protein Structure Initiative (PSI) Center for the Structural Genomics of Pathogenic Protozoa, "ACAPELLA Instrument for Protein Crystallography," January 28, 2003.

Advances in Genome Biology and Technology, Plenary, "MEMS modules for life-on-a-chip," Feb. 6, 2003.

National Academy of Engineering Regional Symposium, Plenary, "Life-on-a-Chip," with Mary Lidstrom, University of Washington, March 13, 2003.

University of Washington, ENGR100 Lecture, "Microscale Life Sciences Center," March 24, 2003.

University of Washington, Department of Biochemistry, Second Annual Meeting for the Protein Structure Initiative (PSI) Center for the Structural Genomics of Pathogenic Protozoa, "ACAPELLA Instrument for Protein Crystallography," March 24, 2003.

Women in Science and Engineering, Annual Symposium, University of Washington, "Faculty Careers," panel with Tara Javidi and Kristi Morgansen, April 12, 2003.

IEEE International Symposium on Circuits and Systems 2003, "Microscale Systems for Analyzing Cells," Bangkok, Thailand, May 25-28, 2003.

University of Washington, Department of Genome Sciences Colloquium, "Life-on-a-Chip," June 4, 2003.

University of Washington, Department of Pathology Colloquium, "Life-on-a-Chip," June 11, 2003.

NIH CEGS Grantees Meeting, Seattle, "Microscale Life Sciences Center," October 21, 2003.

IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS) 2003, Transactions on Automation Science and Engineering Workshop, Las Vegas, "Automation in Biotechnology and Health," October 27, 2003.

IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS) 2003, Las Vegas, "ACAPELLA-5K, A High-Throughput Automated Genome and Chemical Analysis System," October 29, 2003.

Taiwan National Science Council and National Taiwan University, Taipei, "Life-on-a-Chip," December 17, 2003.

Taiwan National Science Council and National Taiwan University, Taipei, "High-Throughput Automation for Functional Genomics," December 19, 2003.

National Cheng Kung University, Tainan, Taiwan, Department of Electrical Engineering Colloquium, "CEGS: Microscale Lifes Sciences Center 'Life-on-a-Chip'," December 22, 2003.

Advances in Genome Biology and Technology, Marco Island, Florida, Plenary, "Detecting Response at the Cellular Level," Feb. 7, 2004.

NIH NHGRI Human Genome Advisory Council, "Microscale Life Sciences Center," Feb. 9, 2004.

University of Colorado, Boulder, Department of Chemistry Colloquium, "Detecting Response at the Cellular Level," Feb. 16, 2004.

University of Washington, Department of Biochemistry, Third Annual Meeting for the Protein Structure Initiative (PSI) Center for the Structural Genomics of Pathogenic Protozoa, "High-Throughput, Capillary-Based Protein Crystallography," March 15, 2004.

Washington State University, special seminar for new program on biotechnology, "Detecting Response at the Cellular Level, Life-on-a-chip," March 22, 2004.

NIH NIGMS Protein Production and Crystallization Workshop, Bethesda, Maryland, "High-Throughput, Capillary-Based Protein Crystallography," March 29-31, 2004.

IEEE International Conference on Robotics and Automation, Biomedical Robotics and Biomechanics Workshop, New Orleans, "Automation in Biotechnology and Health: Biomechanics for Cellular Analysis," April 27, 2004.

Taiwan National Science Council and UW, Seattle, “CEGS: Microscale Life Sciences Center,” May 10, 2004.

NIH CEGS Microscale Life Sciences Center, Scientific Advisory Board meeting, Seattle, “MLSC Technology Development for Life-on-a-chip,” May 28, 2004.

UW Applied Physics Laboratory Colloquium, “The Microscale Life Sciences Center,” June 3, 2004.

NIH CEGS Grantees Meeting, Stanford University, “CEGS Microscale Life Sciences Center (MLSC) ‘Life-on-a-chip’ ” October 21-22, 2004.

WTEC Robotics Project, US Workshop, Washington D.C., “Robotics and Robotics-inspired Algorithms for Molecular and Cellular Biology: Diagnostics, Genomics, Proteomics,” July 21-22, 2004. [workshop to assess the state of robotics in the U.S.].

UW Center for Workforce Development, “The Academic Job Search,” October 19, 2004.

The 22nd Annual Conference on Biomedical Engineering Research, the 2005 HSEMB (Houston Society for Engineering in Medicine and Biology) Conference, Houston, Texas, Plenary, “Life-on-a-Chip,” February 11, 2005.

The 22nd Annual Conference on Biomedical Engineering Research, the 2005 HSEMB (Houston Society for Engineering in Medicine and Biology) Conference, Houston, Texas, keynote, “Automation for Molecular Biotechnology,” February 11, 2005.

The Ocean Dialogues, UW School of Oceanography, “Ecogenomics” (joint presentation with Dr. Ginger Armbrust), April 6, 2005.

UW Robotics, Controls, and Mechatronics Colloquium, College of Engineering, “Microscale Systems for Single Cell Analysis: Life-on-a-Chip,” June 3, 2005.

Engineering Conferences International, Biomedical Engineering XIV, Frontiers and Advances in Biotechnology, Biological and Biomolecular Engineering, Harrison Hot Spring, BC, Canada, “Microsystems for Multi-Parameter Single Cell Analysis for Disease and Cancer Research,” July 10-14, 2005.

NIH CEGS Grantees Meeting, Yale University, “CEGS Microscale Life Sciences Center (MLSC) ‘Life-on-a-chip’,” November 2-3, 2005.

The 2005 Earth Symposium Initiative Symposium, MIT, Cambridge, Massachusetts, Plenary, “Multi-Parameter Genomic Sensing in the Ocean,” November 7-8, 2005.

3<sup>rd</sup> Annual National Academies Keck Futures Initiative Conference, Irvine, California, “Team Science: CEGS Microscale Life Sciences Center – Life-on-a-chip,” November 10, 2005.

University of Washington NEPTUNE Workshop, Seattle, WA, “Ecogenomic Sensors,” (joint with Dr. Ginger Armbrust), November 15-16, 2005.

Arizona State University, Ira A. Fulton School of Engineering, presentations and two-day visit, “Microscale Life Sciences Center: Life-on-a-chip; Disease and Cancer Research; Ecogenomics,” December 5, 2005.

Applied Biosystems, Foster City, California, “Single Cell Analyses for Ecogenomics,” April 6, 2006.

University of Washington NEPTUNE Workshop, Seattle, WA, “Ecogenomic Sensors,” (joint with Dr. Ginger Armbrust), June 5, 2006.

Monterey Bay Aquarium Research Institute, Moss Landing, California, "Life-on-a-chip for Multiparameter Analyses of Microbial Populations," June 16, 2006.

MEPTEC Medical Electronics: Integrating Technologies 2006, Tempe Arizona, "Life-on-a-chip for Biomedical Research," September 21, 2006.

NIH CEGS Grantees Meeting, University of Southern California, "Recent Progress in the CEGS Microscale Life Sciences Center (MLSC)," September 27, 2006.

Marine Genomics, Sorrento, Italy, "Life-on-a-chip for the Oceans," October 30, 2006.

Horizon Community Learning Center, First and Second Grade, Phoenix, Arizona, "Ships and Submarines in the Pacific Ocean," November 17, 2006.

Colloquium on Robotics and Automation, Universita Degli Studi Di Napoli Federico II, Napoli, Italy, "Automating Life-on-a-chip for Biomedical and Ecogenomic Applications," December 18, 2006.

Presidential Weekend for ASU, Vail, Colorado, "Engineering to Improve the Quality of Life," January 28, 2007.

Ira A. Fulton School of Engineering, ASU, Tempe, Arizona, "IAFSE Town Hall," February 14, 2007.

IEEE Phoenix Section Annual Banquet, Keynote Lecture, Tempe, Arizona, "Health and the Environment: from Fundamental Understanding to Future Applications," February 10, 2007.

Horizon Community Learning Center, Fifth and Sixth Grades (250 students), Phoenix, Arizona, "The Future...Imagine," March 7, 2007.

IEEE Distinguished Lecture, Queens University, Kingston, Ontario, Canada, "Life-on-a-Chip for Ecogenomics," March 29, 2007.

Panelist, National Society of Black Engineers, Columbus, Ohio, March 30, 2007.

NIH Roadmap Workshop on the Human Microbiome, Bethesda, Maryland, "Single Cell Monitoring and Expression Analysis," April 23, 2007.

Texas Instruments, Bangalore, India, "Life-on-a-Chip for Health and the Environment," August 20, 2007.

Honeywell, Bangalore, India, "Life-on-a-Chip for Health and the Environment" and "Engineering at Arizona State University," August 22, 2007.

Biocon Limited, Bangalore, India, "Life-on-a-Chip for Health and the Environment," August 23, 2007.

Nanyang Technical University, Singapore, "Ira A. Fulton School of Engineering," September 11, 2007.

IEEE Distinguished Lecture, CERMA 2007, Congreso de Electronica, Robotica y Mecanica Automotriz 2007, Cuernavaca, Morelos, Mexico, "Life-on-a-Chip," September 27, 2007.

NIH CEGS Grantees Meeting, Johns Hopkins University, Baltimore, Maryland, "Overview of the Microscale Life Sciences Center," October 9, 2007.

Institute Advisory Board, The Biodesign Institute, Arizona State University, Tempe, AZ, "Center for Ecogenomics: Ecogenomics and Metagenomics," October 16, 2007.

Marine Genomics Workshop, "Single Cell Technologies," Bermuda, October 29, 2007.

International Conference on BioNanoSciences (ICONBS), Keynote Speech, Taipei, Taiwan, "Single Cell Technologies for Understanding Cancer and Inflammation," December 5, 2007.

Arizona Biosciences Association, Scottsdale, AZ, "Ecogenomic Sensors for Understanding Human Health and the Environment," December 11, 2007.

The Biodesign Institute, Arizona State University, Tempe, AZ, "The Center for Ecogenomics," December 12, 2007.

Town Hall Meetings for Faculty and Staff, Ira A. Fulton School of Engineering, Arizona State University, Tempe, AZ, "The Time is Right for Engineering," January 23 and 25, 2008.

Ira A. Fulton School of Engineering, Deans Corporate Advisory Board, Arizona State University, Tempe, AZ, "The Time is Right for Engineering," February 19, 2008.

Women and Philanthropy, Arizona State University, Tempe, AZ, "Engineering: Beyond the Protractor," March 6, 2008.

Phoenix Rotary 100 Club, Phoenix, AZ, "New Directions in Engineering," March 7, 2008.

Institute for Systems Biology 2008 Annual Symposium, Plenary (Bill Gates closing keynote), Seattle, WA, "Life-on-a-chip: Single Cell Technologies for Health and the Environment," April 21, 2008.

National University of Singapore, Singapore, "Ira A. Fulton School of Engineering, ASU," April 2008.

Nanyang Technological University, Singapore, "Ira A. Fulton School of Engineering, ASU," April 2008.

Scientific Advisory Board of the Microscale Life Sciences Center, Seattle, Washington, "Overview of the Microscale Life Sciences Center, NIH Center of Excellence in Genomic Sciences," May 12, 2008.

Arizona Technology Council, Scottsdale, Arizona, "The time is right for engineering," June 3, 2008.

7<sup>th</sup> World Congress on Intelligent Control and Automation, opening Plenary (~5,000 participants), Chongqing, China, "Automation to Understand and Ultimately Improve Health and the Environment for the Future," June 25, 2008.

6<sup>th</sup> International Forum on Life Science Automation, Plenary, Rostock, Germany, "Life on a Chip: Single Cell Technologies for Health and the Environment," September 12, 2008.

Grace Hopper Celebration of Women in Computing Conference, Keystone, Colorado, Keynote, "Automation to Understand and Ultimately Improve Health and the Environment for the Future," October 2, 2008.

Alumni of Ira A. Fulton School of Engineering Dean's Reception, Berkeley, California, "Ira A. Fulton School of Engineering – The Time is Right," October 3, 2008.

7<sup>th</sup> Arizona Biosciences Leadership Symposium, Plenary, Tucson, Arizona, "Automated Systems to Understand and Ultimately Improve Health and the Environment for the Future," October 6, 2008.

NIH CEGS Grantees Meeting, Plenary, Caltech, Pasadena, California, "Overview of the Microscale Life Sciences Center," October 15, 2008.

Raytheon, presentation to leadership, Tucson, Arizona, "Ira A. Fulton School of Engineering – ASU," October 24, 2008.

Women in Fuel Cells, Fuel Cell Seminar and Exhibition, Plenary, Phoenix, Arizona, "Balance," October 29, 2008.

CASE – Development for Deans Conference, Keynote, Litchfield Park, Arizona, "Successful Development Outcomes by Engaging the Community with a Cause," November 7, 2008.

Town Hall Meetings for Faculty and Staff, Ira A. Fulton School of Engineering, Arizona State University, Tempe, AZ, "Status of the Budget for ASU and Ira A. Fulton School of Engineering," November 25, 2008.

Arizona Board of Regents (ABOR) Meeting, Tempe, Arizona, "Ira A. Fulton School of Engineering," December 4, 2008.

Jennifer Barton and Linda Powers labs, University of Arizona, Tucson, Arizona, "Overview of the Center for Ecogenomics, The Biodesign Institute, ASU," January 22, 2009.

LabAutomation 2009, Palm Springs, California, Keynote, "Automation for Live Single Cell Analyses," January 26, 2009.

Town Hall Meetings for Faculty and Staff, Ira A. Fulton School of Engineering, Arizona State University, Tempe, AZ, "A new Organization for the Ira A. Fulton School of Engineering," February 3, 2009.

Ira A. Fulton School of Engineering, Deans Corporate Advisory Board, Arizona State University, Tempe, AZ, "Building the Engineering School of the Future," February 12, 2009.

Nanyang Technological University, presentation to Dean of Engineering and team, ASU, Tempe, Arizona, "Ira A. Fulton School of Engineering – New Directions," February 12, 2009.

Math, Engineering, and Science Achievement (MESA) Regional Competition, ASU, Tempe, Arizona, "Why a Career in Engineering?" February 28, 2009.

ASU Foundation, presentation to all development officers at ASU, Tempe, Arizona, "It's a New Game!" March 11, 2009.

Microsoft Research advisory board for external research and programs, Redmond, Washington, "Rise to the Challenges," April 1, 2009.

University of Idaho, Moscow, Idaho, "Engineering School of the Future in a New American University," and "Live Single Cell Analyses for Human Health and the Environment," April 9, 2009.

Preparing future faculty program, ASU, Tempe, Arizona, "Work and Life Balance," April 17, 2009.

Commission on the Status of Women Awards Program, Keynote, ASU, Tempe, Arizona, "The New Breed," April 22, 2009.

ADVANCE Program at University of Washington, Seattle, WA, "Life as a Dean in the Midst of Budget Cuts," May 19, 2009.

Ira A. Fulton School of Engineering, Deans Corporate Advisory Board (DCAB), Arizona State University, Tempe, AZ, "Future Plans for DCAB and the Ira A. Fulton School of Engineering," May 21, 2009.

First Science and Technology Roundtable with Congressman Harry Mitchell, August 27, 2009.

Arizona Technology Council, "Ira A. Fulton schools of Engineering: Expanding Major University Opportunities in Arizona," September 15, 2009.

Diversity Evening with Industry, ASU, Tempe, Arizona, September 23, 2009.

CEO Forum, ASU, Tempe, AZ, "We Have a Fight on our Hands," October 2, 2009.

NIH CEGS Grantees Meeting, Plenary, Hudson Alpha Institute, Huntsville, Alabama, "Overview of the Microscale Life Sciences Center," October 14-16, 2009.

Development event with ASU alums, donors, and colleagues, Stanford University, Stanford, California, "Engineering a Better Future," October 22, 2009.

Evening with ASU, Tempe, Arizona, "Ira A. Fulton Schools of Engineering," November 2, 2009.

Robotics Technology and the Next Frontier in Surgical Care Conference, Scottsdale, Arizona, "Future Opportunities," November 7, 2009.

National Academy of Engineering, Frontiers of Engineering Education, Panel on Institutional Organization Change, "Reorganization of the Ira A. Fulton Schools of Engineering," November 18, 2009.

Donor Appreciation Breakfast, ASU, Tempe, AZ, "Your Support Helps Us Be More Competitive," December 7, 2009.

Engineering Staff Town Hall, ASU, Tempe, AZ, "Advancing after the Reorganization," December 10, 2009.

Arizona Science Center event for students and parents in the P3E2 Program: Partnership, Pathway, and Pipeline for Engineering Education, Plenary, "What Engineers Do," January 8, 2010.

PMTec (company) visit to ASU, Tempe, Arizona, "Ira A. Fulton Schools of Engineering and New Engineering Management Degree Program," January 16, 2010.

NRC Committee on an Ocean Infrastructure Strategy for U.S. Ocean Research in 2030, "Novel Genomic Technologies and Sensorbots for Oceans 2030," February 2, 2010.

General Dynamics (GD) Engineering Leadership Team, Scottsdale, Arizona and telecast in U.S. and Canada GD sites, "Research Opportunities with the Ira A. Fulton Schools of Engineering," February 15, 2010.

Preparing future faculty program, ASU, Tempe, Arizona, "Work and Life Balance," March 5, 2010.

NIH National Cancer Institute, Physical Sciences Oncology Program (PS-OC), Washington D.C., "Single-Cell Respiration Rates and Nuclear Morphometry in Normal and Cancer Cells," April 6, 2010.

Grand Challenge Scholars Program, Olin College of Engineering, Needham, MA, "The 'Right Stuff' to Change the World: Grand Challenge Scholars," April 22, 2010.

NSF Ocean Observing Initiative, Science Users Workshop, ASU, Tempe, Arizona, Plenary, "Swarming Sensorbots to Understand the Oceans," April 30, 2010.

IEEE International Conference on Robotics and Automation, Anchorage, Alaska, Plenary, "Automation for the environment and energy," May 5, 2010.

ASU Foundation, presentation to entire development team, ASU, Tempe, Arizona, "Impact of the Ira A. Fulton Schools of Engineering," May 17, 2010.

Meet with national labs (Pacific Northwest National Lab, Idaho National Lab, Lawrence Berkeley National Lab, Joint Genome Institute, Stanford Linear Accelerator, Lawrence Livermore National Lab, Sandia National Lab, Los Alamos National Lab, National Biodefense Analysis and Countermeasures Center,

National Institutes of Standards and Technology) to present “The Biosignature Initiative,” May through August, 2010.

University of Turku, Finland, “Center for Biosignatures Discovery Automation,” September 14, 2010.

NIH CEGS Grantees Meeting, Plenary, Arizona State University, Tempe, Arizona, “Overview of the Microscale Life Sciences Center,” October 28, 2010.

Ira A. Fulton Schools of Engineering, Donor Appreciation Breakfast, ASU, Tempe, AZ, “Impact of the Ira A. Fulton Schools of Engineering and How your Support Benefits All,” December 2, 2010.

Forum for Sustainable Health, Phoenix, Arizona, “The Biosignature Initiative,” February 18, 2011.

International Early Lung Cancer Action Program (I-ELCAP) and International Lung Cancer Consortium (ILCCO), Scottsdale, Arizona, Plenary, “The Biosignature Initiative and the Lung Cancer Demonstration Project,” February 26, 2011.

President’s Community Enrichment Program, ASU, Tempe, Arizona, “Biosignatures for Personalized Health,” April 14, 2011.

IEEE Conference on Automation Science and Engineering, Plenary, Trieste, Italy, “Biosignatures Automation for Improved Human Health,” August 25-27, 2011.

## **Professional Society and Other Service**

### **Society offices held and committee memberships**

President, UW Student Chapter of SWE	1981 – 1982
Regional Representative, SWE	1982 – 1983
Vice President, UW Student Chapter of ASCE	1981 – 1983
JPL Professional Representative to SWE	1985 – 1987
Faculty Advisor, UW Student Chapter of SWE	1995 – 2006
Member, IEEE Robotics and Automation Technical Committee on Automation	1997 – 2011
Region 6 Representative, IEEE Engineering, Medicine, and Biology Society (EMBS) Advisory Committee	1999 – 2000
Professional Activities Committee (PACE) Chair, IEEE Engineering Medicine and Biology Society (EMBS)	1999
U.S. Department of Transportation, Transportation Northwest (TransNow), Secretary	1998 – 2000
Member, IEEE Transactions on Automation Sciences and Engineering (TASE) committee to establish the new T-ASE for IEEE Robotics and Automation Society (RAS)	2002
Steering Committee Representative for IEEE Robotics and Automation Society to the IEEE Transactions on NanoBioscience	2002 – present
Member, EMBS Technical Committee on Biomedical Robotics	2003 – 2011
Representative for IEEE EMBS to the IEEE RAS-EMBS Advisory Committee	2003 – present
Steering Committee member for IEEE EMBS to IEEE Conference on Biomedical Robotics and Biomechatronics, Pisa, Italy	2006
Steering Committee member, IEEE Conference on Automation Science and Engineering	2006 – present
Member, Education Committee for the Association of Laboratory Automation (ALA)	2009 – present
Chair, Advisory Board, IEEE Transactions on Automation Science and Engineering	2010 – present

### **Chair of Major Conferences and Meetings**

General and Program Co-Chair, 1<sup>st</sup> IEEE/RAS-EMBS International Conference on Biomedical Robotics and Biomechanics: BioRob2006, Pisa, Italy, February 20-22, 2006.

Program Chair, 2<sup>nd</sup> IEEE International Conference on Automation Science and Engineering (CASE), Shanghai, China, October 9-10, 2006.

Program Co-Chair, IEEE International Conference on Robotics and Automation, Roma, Italy, April 10-14, 2007.

General Chair, 3<sup>rd</sup> IEEE International Conference on Automation Science and Engineering (CASE), Phoenix, Arizona, September 22-25, 2007.

Chair, National Academy of Engineering Regional Meeting, Arizona State University, Tempe, AZ, April 22-23, 2008.

General Chair, 2<sup>nd</sup> IEEE/RAS-EMBS International Conference on Biomedical Robotics and Biomechanics: BioRob2008, Scottsdale, Arizona, October 19-22, 2008.

Chair, "Sharing the Wealth," a commercialization forum at ASU, Tempe, Arizona, April 24, 2009.

Co-Chair, Robotics Technology and the Next Frontier in Surgical Care Conference, Tempe, Arizona, November 7, 2009.

Chair, National Academy of Engineering (NAE) regional Grand Challenges Summit, Phoenix, Arizona, April 8-9, 2010. [plenary speakers included Leland Hartwell – Nobel laureate; Kristina Johnson – Undersecretary for Energy; James Duderstadt – President Emeritus, U. of Michigan]

Chair, National Science Foundation, Ocean Observing Initiatives (OOI) Science Workshop, Tempe, Arizona, April 29-30, 2010.

Chair, National Institutes of Health (NIH) Centers of Excellence in Genomic Sciences Grantees Meeting, Tempe, Arizona, October 25-29, 2010.

Chair, Lung Cancer Biosignature Demonstration Project Workshop, Phoenix, Arizona, December 13-15, 2010.

Chair, Lung Cancer Biosignature Demonstration Project Workshop (2), Phoenix, Arizona, June 15-17, 2011.

### **Conference Organizing and Program Committees**

Local Arrangements Chair, IFAC Symposium on Control of Distributed Parameter Systems, Los Angeles, California, September 1986.

Program Committee, NASA Workshop on Space Telerobotics, Pasadena, CA, October 1987.

Organizing Committee, 5th International Conference on Automation in Mapping and DNA Sequencing, Washington University in St. Louis, October 8-10, 1998.

Organizing Committee, 6th International Conference on Automation in Mapping and DNA Sequencing, The Sanger Centre, Cambridge, England, September 1-4, 1999.

Technical Program Committee, 1999 IEEE/ASME International Conference on Advanced Intelligent Mechatronics, Atlanta, GA, September 19-22, 1999.

Organizing Committee, National Academy of Engineering, Sixth Annual Symposium on Frontiers of Engineering, Irvine, CA, September 14-16, 2000.

Technical Program Committee, 2001 IEEE/ASME International Conference on Advanced Intelligent Mechatronics, Villa Olmo, Como, Italy, July 8-11, 2001.

Organizer and presenter, first meeting of the Scientific Advisory Board for our NIH CEGS Microscale Life Sciences Center, Seattle, Washington, November 1, 2002.

Program Committee Member, 1<sup>st</sup> IEEE International Conference on Automation Science and Engineering (CASE), Edmonton, Alberta, August 1-2, 2005.

Conference Planning Committee (12-member, Robert Waterston, Chair), W.M. Keck Foundation, National Academies' Future Initiative, "The Genomics Revolution: Implications for Science and Health," the Academies' Beckman Center, Irvine, California, November 10-13, 2005.

Advisory Committee member for IEEE EMBS to the 1<sup>st</sup> IEEE/RAS-EMBS International Conference on Biomedical Robotics and Biomechatronics: BioRob2006, Pisa, Italy, February 20-22, 2006.

Chair, Technical Committee on Biorobotics, IEEE EMBS International Conference, New York, September 2006.

Planning Committee, National Academy of Engineering (NAE) Frontiers of Engineering Education (FOEE), Washington, D.C., November 15-18, 2009.

### **Chair of Conference Sessions**

SAE Teetor Educational Award Recipient Guest at SAE Aerospace Technology Symposium, Anaheim, California, September 1993.

Track Chair, "Biocontrol, Robotics, and Micro-Electro-Mechanical Devices," IEEE EMBS Annual International Conference, Baltimore, Maryland, November 1994.

Session Chair, "Machine Vision," IEEE/ASME International Conference on Advanced Intelligent Mechatronics, Tokyo, Japan, June 1997.

Chair, "Panel on Technology Implementation and Transfer," 5th International Conference on Automation in Mapping and DNA Sequencing, St Louis, October 8-10, 1998.

Chair, DNA Sequencing Technology, 1st NIH NCI Symposium for Grantees on the Molecular Analysis of Cancer, July 6-8, 2000.

Session Co-Chair, "Engineering Challenges and Opportunities in the Genomic Era," National Academy of Engineering, Sixth Annual Symposium on Frontiers of Engineering, Irvine, CA, September 14-16, 2000.

Session Chair, "New Technologies," Advances in Genome Biology and Technology Conference, Marco Island, Florida, Feb. 3-6, 2002.

Session Chair, "Biologically Inspired Robot Systems," IEEE International Conference on Robotics and Automation, New Orleans, LA, April 29, 2004.

Session Co-Chair, "Biorobotics I," The 22nd Annual Conference on Biomedical Engineering Research, the 2005 HSEMB (Houston Society for Engineering in Medicine and Biology) Conference, Houston, Texas, February 11, 2005.

Session Chair, “Automation for the Life Sciences,” 1<sup>st</sup> IEEE International Conference on Automation Science and Engineering (CASE), Edmonton, Alberta, August 1-2, 2005.

Session Chair, “Nano-bio-systems,” 1<sup>st</sup> IEEE/RAS-EMBS International Conference on Biomedical Robotics and Biomechanics: BioRob2006, Pisa, Italy, February 20-22, 2006.

Session Chair, “Life Sciences: Biotechnology,” IEEE International Conference on Robotics and Automation, Rome, Italy, April 12, 2007.

Session Chair, “Panel on Institutional Organizational Change,” National Academy of Engineering (NAE) Frontiers of Engineering Education (FOEE), Washington, D.C., November 18, 2009.

Session Chair: “Single Cell Analyses Technologies and Needs,” National Institutes of Health special Single Cell Analysis Workshop for the NIH Director’s Common Fund, Washington, D.C., April 28-29, 2011.

### Other Conference Participation

SAE Teetor Educational Award Recipient Guest at SAE Aerospace Technology Symposium participated in awardee workshops, panel discussions, and industry tours, Anaheim, California, September 1993.

NSF Women Engineering Leadership Institute participant, Snowbird, Utah, Nov. 2003.

NSF Women Engineering Leadership Advanced Institute participant, Syracuse, New York, Oct. 2004.

The Highlands Forum XXXII “Converging, Combining, Emerging” participant, Scottsdale, Arizona, May 2007.

National Academy of Engineering, “Changing the Conversation: From Research to Action,” Stakeholders’ Workshop, convened by NAE President Charles Vest, participant, Washington D.C., Nov. 30 – Dec. 1, 2010.

### Journal Editorships

Genome Research (Cold Spring Harbor Laboratory Press), Editorial Board	2003 – 2006
IEEE Transactions on Automation Science and Engineering, Senior Editor (1 of 4)	2003 – 2009
Editor for Special Issue on Automation for the Life Sciences	2006
Genomics, Associate Editor	2003 – 2008
International Journal of Robotics Research (IJRR)	2006 – 2008
Guest editor, special issue on BioRobotics	2007

### Reviewer for Journals

IEEE Transactions on Robotics and Automation	1987 – present
Transactions of ASME Journal of Dynamics, Systems, Measurement, and Control	1988 – 1992
Analytical Chemistry	1988 – 2006
Genome Research	1988 – 2006
AIAA Journal of Guidance, Control, and Dynamics	1992 – 2006
IEEE Control Systems Magazine	1992 – 2006
Annals of Biomedical Engineering	1994
IEEE/ASME Transactions on Mechatronics	1997 – 2006
IEEE Transactions on Education	1997 – 2006
Science	1997 – present
BioTechniques	1998 – 2006

Nucleic Acids Research	2000 – 2006
IEEE Proceedings	2000 – 2006
IEEE Spectrum	2000 – 2006
Genomics	2000 – 2006
Annual Review of Biomedical Engineering, Editorial Committee for Vol. 3	2001
IEEE Transactions on Automation Science and Engineering	2004 – present

### Reviewer for Conferences

American Control Conference	1988 – 2006
IEEE Conference on Decision and Control	1988 – 2006
IEEE International Conference on Robotics and Automation	1988 – present
IEEE International Conference on Engineering in Medicine and Biology Society	1993 – present
IEEE/ASME International Conference on Advanced Intelligent Mechatronics	1997 – present
Advances in Genome Biology and Technology (AGBT)	2001 – present
Micro Total Analysis Systems Symposium	2001 – present
IEEE International Symposium on Circuits and Systems	2002 – 2006
International Conference on Mechatronics	2002 – 2006
International Conference on Mechatronics	2002 – 2006
International Conference on Intelligent Robotics and Systems (IROS)	2003
IEEE Conference on Automation Science and Engineering (CASE)	2005 – present
IEEE/RAS-EMBS Intl. Conference on Biomedical Robotics and Biomechatronics	2006 – present

### Grant and Program Reviews

NSF Advisory Panel to review proposals for the Instrumentation and Laboratory Improvement Program in Washington D.C., February 3-6, 1993.

UW Royalty Research Fund, 1993-2006.

NIH NCHGR Special Emphasis Panel to review proposals for Supplement Grants to the NIH Genome Science and Technology Centers for Large-Scale DNA Sequencing, Teleconference 12/10/96, scouting visits to Dallas and San Francisco 12/16-20/96, and meeting in Washington D.C., 1/6-7/97.

NIH NHGRI Panel to review pilot grants for the Human Genome Project, scouting visit in San Francisco, 2/26/97 and meeting in Washington D.C., 3/6/97.

NIH National Cancer Institute Panel to review grants for High-Throughput Technologies to Detect Alterations in Tumors, on-site review, Jan. 28-30, 1998.

NIH NHGRI (National Human Genome Research Institute) Special Emphasis Panel to review proposals for Low-Cost, High-Accuracy DNA Sequencing Technologies, Feb. 26, 1998.

NIH NHGRI Five Year Planning Meeting, Airlie Center, Warrenton, VA, May 28-29, 1998. Invited as 1 of 60 in U.S. to participate in the planning of the Human Genome Project's next five years.

NIH NHGRI Special Emphasis Panel to review grant, site visit, and review at the Whitehead Institute, Boston, August 19, 1998.

NIH NHGRI Special Emphasis Panel to review grant, site visit, and review at the University of Michigan, Ann Arbor, November 6, 1998.

NIH NCI Special Technology Development Review Panel to review 51 applications to the National Cancer Institute, Rockville, Maryland, November 18-20, 1998.

NIH NHGRI Special Emphasis Panel to review grants, site visit, and review at University of Michigan and Stonybrook, New York, Jan. 4-6, 2002.

NIH NHGRI Special Emphasis Panel (Chair) to review grants, site visit, and review at Intelligent Automation Systems and Agencourt Biosciences, Inc., Boston area, March 1, 2002.

NIH NHGRI Special Emphasis Panel (Chair) to review grants, site visit, and review at Genome Therapeutic Corporation and Whitehead Institute/MIT, Boston area, July 11, 2002.

NIH NHGRI Planning Meeting, "Airlie II", Airlie Center, Warrenton, VA, Nov. 18-20, 2002.

NIH NHGRI Special Emphasis Panel to review Advanced Development grant, January 17, 2003.

NIH NCI Special Emphasis Panel to review grants for Innovative Molecular Analysis Technologies Program, March 17-18, 2003.

NIH NHGRI Site Visit of my Advanced Development project on ACAPELLA-5K, automated fluid sample handling system. The Site Visit Team provided a positive report and endorsed our plans for beta-testing of three ACAPELLA instruments starting in June 2003, April 1, 2003.

NIH NHGRI Special Emphasis Panel to review Advanced Development grant, April 4, 2003.

NIH NHGRI Special Emphasis Panel to review Advanced Development grant, April 8, 2003.

NIH NHGRI Special Emphasis Panel to review Advanced Development grant, June 2003.

NIH ISD Special Emphasis Panel to review technology development grants, Nov. 4-5, 2004.

NIH ISD Special Emphasis Panel to review technology development grants, March 9-10, 2005.

NIH NHGRI Special Emphasis Panel to review grants for the \$100,000 and \$1000 genome, March 31, April 1, 2005.

NIH ISD Special Emphasis Panel to review technology development grants, July 18-19, 2005.

NIH National Cancer Institute and National Human Genome Research Institute, "Toward a Comprehensive Genomic Analysis of Cancer: A Roundtable Discussion," Workshop, July 20-22, 2005.

HHS National Human Genome Research Advisory Council, Bethesda, September 11-12, 2005.

NIH National Human Genome Research Institute Grantees Workshop, \$100,000 and \$1000 Genome, February 5-6, 2006, Marco Island, Florida.

HHS National Human Genome Research Advisory Council, Bethesda, February 12-13, 2006.

HHS National Human Genome Research Advisory Council, Bethesda, May 21-21, 2006.

National Science Foundation ORION Review Panel for the Conceptual Design of the ORION project, Ocean Observing Initiative (OOI), \$310 million project, Monterey, California, August 14-17, 2006.

HHS National Human Genome Research Advisory Council, Bethesda, September 11-12, 2006.

NIH National Human Genome Research Institute Grantees Workshop, \$100,000 and \$1000 Genome, February 5-7, 2007, Marco Island, Florida.

- HHS National Human Genome Research Advisory Council, Bethesda, February 12-13, 2007.
- HHS National Human Genome Research Advisory Council, Bethesda, May 21-22, 2007.
- HHS National Human Genome Research Advisory Council, Bethesda, February 11-12, 2008.
- National Human Genome Research Institute, 5- year Review of Eric Green, M.D., Ph.D., Scientific Director for Intramural Research, Chair of Review Committee, February 12-13, 2008.
- NIH National Human Genome Research Institute Grantees Workshop, \$100,000 and \$1000 Genome, March 19-20, 2008, San Diego, California.
- HHS National Human Genome Research Advisory Council, Bethesda, May 19-20, 2008.
- HHS National Human Genome Research Advisory Council, Bethesda, September 8-9, 2008.
- Swiss National Science Foundation International Review Panel, SystemsX (Systems Biology) program, Zurich, Switzerland, April 27-28, 2009.
- National Research Council, Input to the Committee on an Ocean Infrastructure Strategy for U.S. Ocean Research in 2030, Washington, D.C., February 2-3, 2010.
- NIH, National Institute of Allergy and Infectious Disease (NIAID) / Division of Microbiology and Infectious Diseases (DMID) Genomics Blue Ribbon Panel, to review the genomics activities DMID has implemented over the past ten years, and advise on future endeavors, Bethesda, Maryland, February 4, 2010.
- NIH Director's (Francis Collins) "Big Think" meeting to brainstorm ideas for the Common Fund, Bethesda, Maryland, May 7, 2010.
- NIH NHGRI Strategic Planning Meeting on Genomics, Airlie Center, Warrenton, VA, July 6-8, 2010.
- Swiss National Science Foundation International Review Panel, SystemsX (Systems Biology) program, Zurich, Switzerland, Site Visits, October 21-22, 2010.
- HHS National Human Genome Research Advisory Council, Bethesda, February 7-8, 2011.
- NIH Common Fund "Single Cell Analysis Workshop," to brainstorm gaps in single cell analysis technologies and science, led future technologies session, Rockville, Maryland, April 28-29, 2011.
- HHS National Human Genome Research Advisory Council, Bethesda, May 16-17, 2011.

## **Service**

### **Departmental Service**

- Member, University of Washington Department of Electrical Engineering Development Committee, Sept. 1992-Aug. 1993.
- Member, University of Washington Department of Electrical Engineering Undergraduate Admissions Committee, Sept. 1992-Aug. 1993.
- Member, University of Washington Department of Electrical Engineering Graduate Studies Committee, Sept. 1993-1998 (graduate admissions subcommittee, 93-94; graduate recruiting subcommittee, 93-95; appeals subcommittee, 94-98; qualifying exam subcommittee, 95-98).

Member, University of Washington Department of Electrical Engineering Advisory Committee, June 1997- August 1998.

Member, Frontiers Advisory Committee, University of Washington Department of Molecular Biotechnology Frontiers Lecture Series, 1996-98.

Member, University of Washington Department of Electrical Engineering ABET 2000 Committee, October 1997 - August 1998.

Member, University of Washington Department of Electrical Engineering Undergraduate Studies and ABET 2000 Committee, September 1998 - June 1999; January – December 2000.

Member, University of Washington Department of Electrical Engineering EE/CSE Building Phase B Committee, September 1998 - April 1999.

Member, University of Washington Department of Electrical Engineering Strategic Planning Committee, May 1999 – December 2000.

Member, University of Washington Department of Electrical Engineering Space Committee, May 1999 - January 2000.

Member, University of Washington Department of Electrical Engineering Continuous Improvement Program (CIP) for Undergraduate Education, 2000.

Member, University of Washington Department of Electrical Engineering, Advisory Committee to the Chair, March 2000 - December 2000.

Member, University of Washington Department of Electrical Engineering, Research Committee, March 2000 – December 2006.

Member, University of Washington Department of Electrical Engineering, Faculty Search Committee, January – June 2002.

Member, University of Washington Department of Electrical Engineering, Curriculum Committee, September 2002 – June 2003.

Chair, University of Washington Department of Electrical Engineering, Robotics and Controls Curriculum Group, January 2002 – August 2003.

Chair, University of Washington Department of Electrical Engineering, Faculty Peer Review of Teaching, November 2002 – March 2005.

Member, University of Washington Department of Electrical Engineering, Faculty Advisory Committee to the Chair, October 2002 – June 2006.

Reviewer, University of Washington Department of Electrical Engineering, Undergraduate Fellowship Awards, reviewed and judged 30 applications, Spring 2004.

### **College Service**

Member, University of Washington Women in Science and Engineering (WISE) Faculty Advisory Board, Nov. 1992-2006; Scholarship Committee, 1997-2006; Professional Mentor 1997 - 2006; Faculty Mentor 1999 - 2006.

Member, University of Washington College of Engineering Open House Steering Committee, Jan. 1994-Apr. 1994.

Faculty Advisor, University of Washington Society of Women Engineers (SWE), Mar. 1995-August 2006.

Member, University of Washington Search Committee for Chair of Electrical Engineering, October 1997 - June 1998.

Member, University of Washington ECSEL Board as theme leader for Student and Faculty Professional Development, October 1997 - December 2001. This position involves participating in reviews of all ECSEL proposals and projects, organizing workshops and speakers for faculty and student development, interacting with CELT, and co-founding the Student Leadership Board.

Member, University of Washington Center for Engineering Learning and Teaching (CELT) Search Committee for Educational Specialist Staff Member, September 1998 - May 1999; again in May 2000.

Member, University of Washington College of Engineering Faculty and Staff Awards Committee, March 1999.

Member, University of Washington College of Engineering Excom Plus Committee, January 2002 – June 2006.

Member, University of Washington College of Engineering, Five-Year Review of EE Chair, Professor Howard Chizeck, March—July 2003.

Representative (1 of 5), University of Washington College of Engineering, to Taiwan National Science Council to establish bioengineering research in Taiwan, January 2003, December 2003 (week long trip with presentations in Taipei), May 2004.

Member, University of Washington, School of Medicine, Committee to select Rosetta Fellowships, July 2004.

Dean, Ira A. Fulton School of Engineering, Arizona State University, January 2007 – present.

### **University Service**

Member, University of Washington Faculty Senate Special Committee on Faculty Women, Jan. 1995-June 1995.

Member, University of Washington Search Committee for Dean of Engineering, May 1995-May 1996 (Jean-Loup Baer, Chair).

Member, University of Washington Annual Faculty Lectureship Committee, Jan. 1997-Dec. 1998.

Member, University of Washington Special Committee to the President to review Vice President Ron Johnson, May-June 1999.

Member, University of Washington Committee for 10-year Review of the Department of Computer Science and Engineering, July 1999 – April 2000 (Tom Daniel, Chair).

Member, UW Blueprint Team to evaluate and provide input for K-12 activities, 12/99 - 12/00.

Presenter for University of Washington Dinner Series, “What’s next in the Human Genome Race,” September 23, 2002, hosted by Chris Larson and Julia Calhoun.

Member, UW Grant and Contract Services (GCS) / Human Subjects Division (HSD) Advisory Council, Carol Zuiches (Chair), January 2004 – December 2006.

Member, University of Washington Provost Search Committee, October 2004 – June 2005.

UW College of Engineering Representative to the NEPTUNE project (cabled underwater observatory), 4/20/2005 – December 2006. Work with J. Delaney, Director, on moving NEPTUNE project forward for UW, build teams of investigators, and work on development.

Member, Danz and Walker-Ames Lecture series committee, June 2005 – December 2006.

Member, University Management Team, Arizona State University, January 2007 – present.

Member, Advisory Board, CareerWISE, 2007 – present.

Co-Director (with Rick Shangraw), Search Committee for the Dean/Director of the ASU Global Institute of Sustainability (GIOS), 2009.

ASU Sustainability Practices Network (SPN) Oversight Advisory Board, November 2009 – present.

Provost Capaldi's Education Envoy Executive Work Group, 2010.

### **Community Service**

Instructor, University of Washington Molecular Biotechnology Integrated Science Partners Middle School Outreach Summer School, July 1996.

Member, Northend JCC Parent Council, September 1997 - July 1999.

Member, Lakeridge Elementary PTA, Mercer Island, WA, September 2000 – June 2006.

Presentation of AIBO robot to Lakeridge Elementary Kindergarten students, Spring 2001.

Presentation of lego robots (with Linda Bushnell and Andy Crick) to Lakeridge Elementary 1<sup>st</sup> grade students, Spring 2002.

Presentation to GEMS (Girls in Engineering, Math, and Science), Fred Hutchinson Cancer Research Center, Spring 2002.

Presentation on NEPTUNE project to Lakeridge Elementary 3<sup>rd</sup> grade students, June 2004.

Presentation on China to Lakeridge Elementary Kindergarten students, January 2005.

Member, Advisory Panel to the Pacific Science Center, Seattle, September 2005-December 2006.

Presentation on Ships and Submarines in the Pacific Ocean to 1<sup>st</sup> and 2<sup>nd</sup> grade, Horizon Community Learning Center, Phoenix, Arizona, December 2007.

Presentation about the Future to 5<sup>th</sup> and 6<sup>th</sup> grade (250 students), Horizon Community Learning Center, Phoenix, Arizona, February 2007.

Adjunct Faculty, Horizon Community Learning Center (K-12), Phoenix, Arizona, January 2007—present.

Meet with Sedona 30 and Superintendent of the Sedona School District to advise on STEM education for K-12, November 10, 2008.

Judge for FIRST LEGO League competition, Flagstaff, Arizona, December 5, 2008.

Judge and sponsor for FIRST LEGO League State Competition (Arizona), Tempe, Arizona, December 13, 2008.

Distinguished Visitor Program with the Navy—flew on a C-2A Greyhound from Coronado Island, California to 100 miles offshore, landed on the aircraft carrier USS Nimitz (CVN 68), watched flight operations of F/A-18 Hornets and E/A-6B Prowlers, toured ship, spent night, catapulted off and back to Coronado Island, March 5-6, 2009.

Tour of Center for Ecogenomics at the Biodesign Institute, ASU, for Girl Scout Troop from Phoenix Country Day School September 25, 2009.

Clarkdale Sustainability Park, Strategic Planning, Clarkdale, Arizona, November 14, 2009.

Judge and sponsor for FIRST LEGO League State Competition (Arizona), Tempe, Arizona, December 12, 2009.

Strategic Planning with all ~250 School Boards (K-12) in School Boards Leadership Conference, Flagstaff, Arizona, “VMGO in the ASU Ira A. Fulton Schools of Engineering,” July 23, 2010.

### **National Service**

#### **Policy Committees**

Member, National Human Genome Advisory Council, Department of Health and Human Services, May 2006 – September 2008; February 2011 – present.

Ad-Hoc Member, National Human Genome Advisory Council, Department of Health and Human Services, September 2005 – April 2006.

Member, Instrumentation Systems Development (ISD) Study Section, National Institutes of Health (NIH), April 2005 – August 2005.

Member, Peer Review Oversight Group (PROG), Office of the Director, National Institutes of Health (NIH), Jan. 31, 2000 – Sept. 2004.

Nominated, Electorate Nominating Committee, American Association for the Advancement of Science, Jan. 1, 2003 – Dec. 31, 2005.

#### **Scientific Advisory Boards**

Member, National Science Foundation ORION Review Panel for the Conceptual Design of the ORION project, Ocean Observing Initiative (OOI), \$310 million Major Research Equipment Facilities Construction (MREFC) account, August 2006.

Department of Energy, Joint Genome Institute, Scientific Advisory Board for Director of JGI, Dec. 4, 2000 – Dec. 2002.

Climos, Inc., Alexandria, VA: Member, Scientific Advisory Board, Feb. 2007 – March 2011.

Microsoft Research, Bellevue, WA; Member, Advisory Board for the External Research and Programs Office, July 1, 2007 – present.