

1. General Biographical Information

1.1 Basic Data

Name: Deirdre R. Meldrum
Institution: Arizona State University
Department Affiliations: Dean, Ira A. Fulton School of Engineering
 Director, Center for Ecogenomics, Biodesign Institute
Telephone Number: (480) 965-9235
Fax Number: (480) 965-8855
E-mail Address: deirdre.meldrum@asu.edu

1.2 Educational History

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

1.3 Employment History

a. Arizona State University

Academic Appointments

Dean, Ira A. Fulton School of Engineering	Jan. 1, 2007 – present
Professor, Dept. of Electrical Engineering	Jan. 1, 2007 – present
Director, Center for Ecogenomics, Biodesign Institute	Jan. 1, 2007 – present

b. University of Washington

Academic Appointments

Assistant Professor, Dept. of Electrical Engineering	Sept. 16, 1992 - Sept. 15, 1998
Associate Professor, Dept. of Electrical Engineering	Sept. 16, 1998 - Sept. 15, 2001
Professor, Dept. of Electrical Engineering	Sept. 16, 2001 – Dec. 31, 2006
Adjunct Assistant Professor, Dept. of Bioengineering	Sept. 16, 1997 - Sept. 15, 1998
Adjunct Associate Professor, Dept. of Bioengineering	Sept. 16, 1998 - Sept. 15, 2001
Adjunct Professor, Dept. of Bioengineering	Sept. 16, 2001 – Dec. 31, 2005
Adjunct Professor, Dept. of Mechanical Engr.	Sept. 16, 2001 - Dec. 31, 2006
Adjunct Professor, Dept. of Electrical Engineering	Jan. 1, 2007 - present

c. Employment Prior to ASU and UW Appointments

Stanford University

9/87 - 9/92

Department of Electrical Engineering

NASA Fellow and Amelia Earhart Fellow (9/89-6/92): Obtained new results in adaptive control of multi-link serial manipulators using spatial operator algebra.

Teaching Assistant (9/88-12/89): Teaching assistant for courses in Digital Signal Processing, Feedback Control Design, Electromagnetic Fundamentals, and Electromagnetic Waves (undergraduate & graduate courses).

Research Assistant (9/87-6/88): Investigated adaptive time-optimal control of flexible structures. (advisor: Gene F. Franklin)

Jet Propulsion Laboratory/Caltech

6/84 - 8/84, 1/85 - 6/87

Galileo Flight Test Group, Guidance and Control Section, (6/84-8/84)

Summer Intern: Tested the Galileo spacecraft flight software with flight hardware in the loop.

Machine Intelligence Systems Group, Automated Systems Section, (1/85-6/87)

Member of Technical Staff: Conducted research under Dr. Guillermo Rodriguez. Developed algorithms for robot control, flexible space structure control, and identification. Tested identification algorithms on a 12 rib flexible antenna experiment.

Rensselaer Polytechnic Institute

6/83 - 12/84

Department of Electrical Engineering

Teaching Assistant: Teaching assistant for courses in Probability, Discrete Time Systems, Linear Systems, and General Engineering Lab (undergraduate and graduate courses).

Washington State Department of Transportation

6/82 - 6/83

Design Engineer: Electrical and structural design of traffic signals and signs.

NASA Johnson Space Center

6/81 - 12/81, 6/80 - 12/80

Engineering Co-op Student: Shuttle Mission Simulator instructor for astronauts; specifically, for the environmental control and life support systems and Shuttle payloads.

University of Washington

1/81 - 6/81, 1/80 - 6/80

Engineering Graphics Tutor: Advised and graded students on their engineering drawings.

Puget Sound Naval Shipyard

6/79 - 12/79

Engineering Co-op Student: Designed and inspected foundations to mount equipment on Navy ships and submarines.

d. Consulting or Professional Practice

Exelixis Pharmaceuticals, Inc., South San Francisco, CA: Invited to consult on biotechnology automation, Nov. 12, 1997; Feb. 18, 1998; Nov. 13, 1998; minimum 4 days/year effective 7/1/99.

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

e. Special Government Employee (temporary consultant)

Member, National Human Genome Advisory Council, Department of Health and Human Services, May 2006 – December 2008.

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.

Member, Scientific Advisory Board, Joint Genome Institute (JGI), Department of Energy (DOE), Dec. 2000 – Dec. 2002.

1.4 Awards and Honors

Dive in the Alvin submersible off R/V Atlantis to 2200 m below sea level at Endeavor Ridge in NE Pacific Ocean 8/31/2006

Distinguished Lecturer for IEEE Robotics & Automation Society 1/2006-12/2007
 W.M. Keck Foundation, National Academies' Future Initiative, "The Genomics Revolution: Implications for Science and Health," Conference Planning Committee 2005
 IEEE Fellow for "contributions to genome automation" 2004
 NSF Women Engineering Leadership Advanced Institute participant, Syracuse, New York, Oct. 2004
 NSF Women Engineering Leadership Institute participant, Snowbird, Utah, Nov. 2003
 AAAS Fellow for "innovative engineering research and leadership in genome automation through the development of highly automated methods for manipulating biochemical samples in submicroliter volumes" 2003
 Editor (1 of 4) for IEEE Transactions on Automation Science & Engineering 2003-present
 Editorial Board for Genomics 2003-present
 Editorial Board for Genome Research (Cold Spring Harbor Laboratory Press) 2003-present
 Steering Committee Representative for Robotics and Automation for IEEE Transactions on Nanobioscience 2002-present
 PI, Director (with M. Lidstrom), NIH NHGRI Center of Excellence in Genomic Science (CEGS) "Microscale Life Sciences Center", 8/2001 - 7/2011
 "Faculty of 1000" - new online service to organize & evaluate information in the life sciences literature 4/2001 - present [invited by Genomics Section heads Eric Green and Pat Brown]
 DOE Joint Genome Institute, Scientific Advisory Board, 12/2000 - 12/2003
 NIH Peer Review Oversight Group (PROG), Advisory Committee to the NIH Director, 1/2000-9/2004.
 UW Ford Embedded Systems Award for Graduate Students, Advisor for students of 1st & 2nd place, 6/2000
 Best Automation Paper Award Finalist (1 of 4), IEEE International Conference on Robotics and Automation, 4/2000
 UW CoE & EE Open House Display (with students), 1st place, 4/98
 UW CoE Outstanding Faculty Award for Control Systems Laboratory & Curriculum, 5/97 (with J. Vagners of Aeronautics/Astronautics and M. Berg of Mechanical Engineering)
 University of Idaho Honors Convocation Speaker, 4/97
 Presidential Early Career Award for Scientists and Engineers (nomination by NIH), 12/96-05/01 "for recognition of innovative research utilizing a broad set of interdisciplinary approaches to advance DNA sequencing technology." [President William Clinton]
 NAE First Annual Symposium on Frontiers of Engineering (1 of 95 invited participants), 9/95
 NIH NCHGR Special Emphasis Research Career Award, 9/93 - 9/98
 SAE Ralph R. Teetor Educational Award, '93
 Sigma Xi, The Scientific Research Society, full member 12/93 - present
 Best Presentation Award for Session, 1991 American Control Conference
 NASA Graduate Student Researchers Fellowship, 7/89 - 6/92
 Zonta International Amelia Earhart Fellowship, 7/89 - 6/91
 Scholars Toppers Award, Rensselaer Polytechnic Institute, 9/83 - 6/84
 Luther E. Gregory Scholarship, University of Washington, 9/81 - 6/83
 Chi Epsilon, Civil Engineering Honor Society, 1/82 - present
 Mortar Board, 1/82 - present
 Scholarship for Entering Freshmen, University of Washington, 6/78 - 9/79
 Valedictorian, Moscow High School, 6/78
 Junior Engineering Technical Society & Women in Engineering Scholarships, U of Idaho, 6/77

1.5 Affiliations and Other

University of Washington:

Adjunct Assistant Professor, Dept. of Bioengineering, September 16, 1997 - Sept. 15, 1998
 Adjunct Associate Professor, Dept. of Bioengineering, September 16, 1998 - September 15, 2001
 Adjunct Professor, Dept. of Bioengineering, September 16, 2001 - December 31, 2005
 Adjunct Professor, Dept. of Mechanical Engineering, September 16, 2001 - December 31, 2006
 Adjunct Professor, Dept. of Electrical Engineering, January 1, 2007 - present

2. Publications

2.1 Refereed Archival Journal Publications

Journal articles

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, pp. 357-364, 1988.
2. J. T. Wen and D. R. Meldrum, "Discrete-time model reference adaptive control using CGT concept," *NASA Tech Briefs Jo.*, vol. 13, no. 3, p. 48, March 1989.
3. D. R. Meldrum, "The interdisciplinary nature of genomics," *IEEE Engineering in Medicine and Biology*, 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].
6. Lauren Sjooben and Deirdre Meldrum, "Compact jam resistant capillary dispenser for automation systems," *Laboratory Robotics and Automation*, vol. 10, pp. 15-17, 1998.
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.
8. Neal Friedman and Deirdre Meldrum, "Capillary tube resistive thermal cycling," *Analytical Chemistry*, vol. 70, no. 14, pp. 2997-3002, July 15, 1998.
9. C. Taylor and D. R. Meldrum, "Fuzzy ramp metering: design overview and simulation results," *Transportation Research Record*, no. 1634, pp. 10-18, 1998.
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.
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, 1999.
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.
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.
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].

15. Deirdre Meldrum, "Automation for genomics: Part 1, preparation for sequencing," *Genome Research*, vol. 10, no. 8, pp. 1081-1092, August 2000 [invited].
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].
17. D. Meldrum, "Sequencing genomes and beyond," *Science*, vol. 292, no. 5516, pp. 515, 517, 20 April 2001 [invited by editor].
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].
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].
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*.
21. J. Koschwanetz, and D. Meldrum, "Picture Perfect", *OE Magazine*, 4, 28-30, Nov/Dec 2004 [invited by editor].
22. 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), <http://www.springerlink.com/index/10.1007/s10404-004-0023-6>, vol. 1, no. 2, pp. 155-160, 2005.
23. 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, 2005.
24. 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. 62, no. 3, pp. 271-279, March 2006.
25. 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 in 5 μ L 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).
26. Deirdre R. Meldrum, "Automated systems for genome analyses," *Journal of the Robotics Society of Japan*, vol. 24, no. 5, pp. 570-572, July 2006.
27. A. Cody Young, Joe Dragavon, Tim Strovos, Tim Molter, Lixin Zheng, Lloyd Burgess, Alex K.-Y. Jen, Mary Lidstrom, Deirdre Meldrum, "Two-photon lithography of platinum porphyrin oxygen sensors," *IEEE Sensors*, in press 2007.
28. Shih-hui Chao, Robert Carlson, and Deirdre Meldrum, "Rapid fabrication of microchannels using microscale plasma activated templating (μ PLAT) generated water molds," *Lab-on-a-chip*, in press 2007.
29. John Koschwanetz, Robert Carlson, Deirdre Meldrum, "Easily fabricated magnetic traps for single-cell applications," *Review of Scientific Instruments*, in press 2007.

30. Timothy W. Molter, Mark R. Holl, Joseph M. Dragavon, Sarah C. McQuaide, Judith B. Anderson, Lloyd W. Burgess, Mary E. Lidstrom, and Deirdre R. Meldrum, "A novel approach for measuring single cell oxygen consumption rates," *IEEE Transactions on Automation Science and Engineering*, in press 2007.
31. Jang, L.S., S. H. Chao, M. R. Holl, and D. R. Meldrum, "Resonant mode-hopping micromixing," *Sensors and Actuators A*, in review 2006.

Journal Abstracts

1. D. R. Meldrum, R.C. Seubert, R.H. Kraft, P.J. Wiktor, N. Friedman, M. Daoura, E. Tongco, and M. Gibescu, "Automated restriction enzyme digest and PCR analysis in glass capillaries," talk and poster presented at the *Seventh International Genome Sequencing and Analysis Conference*, Hilton Head, South Carolina, September 1995. Abstract published in *Genome Science and Technology*, Vol. 1, No. 1, 1995, p. P-78, J. Craig Venter, Editor-in-Chief; invited as 1 of 88 speakers at the conference with 800 participants.
2. D. R. Meldrum, W. H. Pence, P. J. Wiktor, S. E. Moody, D. J. Cunningham, H. T. Evensen, L. R. Sjoboen, E. B. Arutunian, N. A. Friedman, E. C. Tongco, J. M. Reiter, "Acapella: an instrument for automated fluid sample preparation," *Ninth International Genome Sequencing and Analysis Conference*, Hilton Head, South Carolina, September 13-16, 1997. Abstract published in *Journal of Microbial and Comparative Genomics*, vol. 2, no. 3, 1997; invited as 1 of 57 speakers at the conference with 1200 participants.
3. 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," *Tenth International Genome Sequencing and Analysis Conference*, Miami, Florida, September 17-20, 1998. Abstract published in *Journal of Microbial and Comparative Genomics*, vol. 3, no. 3, 1998.
4. D.R. Meldrum, W.H. Pence, H.T. Evensen, S.E. Moody, D.L. Cunningham, N.A. Friedman, E.B. Arutunian, and M. Saini, "Introduction of the ACAPELLA-5K automated fluid sample handling system," *Eleventh International Genome Sequencing and Analysis Conference*, Miami, Florida, September 18-21, 1999. Abstract published in *Journal of Microbial and Comparative Genomics*, vol. 4, no. 2, 1999.

students I supervise; research engineer I supervise; research associate (postdoc) I supervise; personnel on subcontract of grant for which I am PI; research scientist I supervise; speaker is underlined

2.2 Conference Proceedings and Other Non-Journal Articles

Non-journal fully refereed publications

1. D. R. Meldrum and M. J. Balas, "Direct adaptive control of a flexible remote manipulator arm," *Winter Annual Meeting of the American Society of Mechanical Engineers*, Miami, Florida, PED-Vol. 15, pp. 115-119, November 1985.
2. F. Y. Hadaegh, D. S. Bayard, D. R. Meldrum, and E. Mettler, "On-orbit flexible body parameter identification for space station," *Vibration Damping II Workshop*, Las Vegas, Nevada, pp. DF-1 -DF-15, March 1986.
3. D. R. Meldrum and M. J. Balas, "Application of model reference adaptive control to a flexible remote manipulator arm," *Proceedings of the American Control Conference*, Seattle, Washington, pp. 825-832, June 1986.

4. J. T. Wen, D. R. Meldrum, and M. J. Balas, "Discrete-time model reference adaptive control using CGT concept," *Winter Annual Meeting of the American Society of Mechanical Engineers*, Anaheim, California, DSC-Vol. 3, pp. 17-22, December 1986.
5. R. L. Kosut, D. R. Meldrum, and G. F. Franklin, "Adaptive control of a nonlinear oscillating system," *Proceedings of the American Control Conference*, Pittsburgh, Pennsylvania, pp. 2554-2559, 1989.
6. A. M. Pascoal, M. L. Workman, R. L. Kosut, G. F. Franklin, and D. R. Meldrum, "Adaptive time-optimal control of flexible structures," *Proceedings of the American Control Conference*, Pittsburgh, Pennsylvania, pp. 19-24, 1989.
7. D. R. Meldrum, G. Rodriguez, and G. F. Franklin, "An order (N) recursive inversion of the Jacobian for an N-link serial manipulator," *Proceedings of the 1991 IEEE International Conference on Robotics and Automation*, pp. 1175-1180, June 1991.
8. D. R. Meldrum, G. Rodriguez, and G. F. Franklin, "Efficient control with an order (N) recursive inversion of the Jacobian for an N-link serial manipulator," *Proceedings of the 1991 American Control Conference*, pp. 2039-2044, June 1991.
9. D. R. Meldrum, "Efficient Adaptive Control of a Two-Armed Free-Flying Robot," *Proceedings of the IFAC Symposium on Aerospace Control*, Ottobrunn, Germany, pp. 327-331, September 1992.
10. D. R. Meldrum, G. F. Franklin, and P. J. Wiktor, "An inverse Jacobian solution for the control of multi-link flexible manipulators," *Proceedings of the 1993 American Control Conference*, San Francisco, pp. 1814-1815, 1993.
11. D. R. Meldrum, G. F. Franklin, and P. J. Wiktor, "Control of manipulators with some unactuated joints," *Proceedings of the 1993 IFAC World Congress*, Sydney, Australia, Vo. 3, Applications I, pp. 345-348, July 1993.
12. E. Tongco and D. R. Meldrum, "Optimal sensor placement and active vibration suppression of large flexible space structures," *Proceedings of the AIAA Guidance, Navigation and Control Conference*, Scottsdale, AZ, pp. 858-866, August 1994.
13. E. Tongco, D. R. Meldrum, and P. J. Wiktor, "The minimum control authority for flexible structures," *Proceedings of the AIAA Guidance, Navigation and Control Conference*, Scottsdale, AZ, pp. 1131-1139, August 1994.
14. C. E. Taylor and D. R. Meldrum, "Freeway traffic data prediction via artificial neural networks for use in a fuzzy logic ramp metering algorithm," *Proceedings of the Intelligent Vehicles Symposium*, Paris, France, pp. 308-313, October 1994.
15. D. R. Meldrum, "Requirements for automated sample handling in genome analysis," *Proceedings of the IEEE EMBS*, Baltimore, pp. 1047-1048, November 1994.
16. C. E. Taylor and D. R. Meldrum, "Freeway traffic data prediction using neural networks," *Proceedings of the Pacific Rim TransTech Conference*, Seattle, Washington, pp. 225-230, July 30 - August 2, 1995.
17. C. E. Taylor and D. R. Meldrum, "A fuzzy controller to meter freeway on-ramps," *Proceedings of the International Fuzzy Systems and Intelligent Control Conference*, Maui, Hawaii, pp. 57-66, April 1996.
18. Deirdre Meldrum, "A biomechatronic fluid sample handling system for DNA processing," *Proceedings of the 1997 IEEE/ASME International Conference on Advanced Intelligent Mechatronics*, Tokyo, abstract p. 6, manuscript on CD-ROM (no pg.), June 16-20, 1997.

19. C. Taylor and D. R. Meldrum, "Fuzzy ramp metering: design overview and simulation results," *Proceedings of the Transportation Research Record*, January 1998.
20. D. R. Meldrum, H.T. Evensen, W. H. Pence, S. E. Moody, D. L. Cunningham, and P. J. Wiktor, "Acapella, a capillary-based submicroliter automated sample preparation system for genome analysis," *Proceedings of the 1999 IEEE/ASME International Conference on Advanced Intelligent Mechatronics*, Atlanta, GA, pp. 39-48, Sept. 19-22, 1999 [presented by graduate student Glen Klute].
21. C. Taylor, D.R. Meldrum, and L. Jacobson, "Results of the on-line implementation and testing of a fuzzy logic ramp metering algorithm," *Proceedings of the Transportation Research Board*, January 2000.
22. D. R. Meldrum and S.E. Moody, "Automating high throughput fluid sample handling for biotechnology and chemistry," *Proceedings of the 2000 IEEE International Conference on Robotics and Automation*, San Francisco, pp. 198-205, April 24-28, 2000 [invited for special session; Finalist for Best Automation Paper (1 of 4)].
23. Shane M. Crippen, Mark R. Holl, and Deirdre R. Meldrum, "Examination of dielectrophoretic behavior of DNA as a function of frequency from 30 Hz to 1 MHz using a flexible microfluidic test apparatus," *Micro Total Analysis Systems 2000, Proceedings of the MicroTAS 2000 Symposium*, (Editors A. van den Berg, W. Olthuis and P. Bergveld, Kluwer Academic Publishers), Enschede, The Netherlands, pp. 529-532, May 14-18, 2000.
24. Deirdre R. Meldrum, William H. Pence, Stephen E. Moody, David L. Cunningham, Mark Holl, Peter J. Wiktor, Mohan Saini, Matthew P. Moore, Ling-Sheng Jang, Molly Kidd, Vitaliy Mosesov, "Automated, integrated modules for fluid handling, thermal cycling and purification of DNA samples for high throughput sequencing and analysis," *Proceedings of the 2001 IEEE/ASME International Conference on Advanced Intelligent Mechatronics*, Como, Italy, pp. 2:1211-1219, July 8-11, 2001.
25. L.S. Jang, M. S. Saini, M. R. Holl, and D. R. Meldrum, "Purification of DNA sequencing products with a model compound in a high-throughput microfluidic format, the ACAPELLA-5K", *Micro Total Analysis Systems 2001, Proceedings of the MicroTAS 2001 Symposium* (Kluwer Academic Publishers), Monterey, CA, USA, pp. 115-116, 21-25 October 2001.
26. T. P. Mann, M. R. Holl, M. S. Saini, D. R. Meldrum, et al. "Real-time fluorescence detection of DNA in 5 μ l capillary channels for minimal residual disease quantification using the ACAPELLA-5K high-throughput automated analysis system", *Micro Total Analysis Systems 2001, Proceedings of the MicroTAS 2001 Symposium* (Kluwer Academic Publishers), Monterey, CA, USA, pp. 575-576, 21-25 October 2001.
27. D. R. Meldrum, W. Pence, S. E. Moody, D. L. Cunningham, M. R. Holl, P. J. Wiktor, "Automated microfluidics for genomics," *Proceedings of the 23rd Annual International Conference of the IEEE Engineering in Medicine and Biology Society*, Istanbul, Turkey, vol. 3, pp. 2923-2926, 2001.
28. T. Fattah Kosar, D. R. Meldrum, M. R. Holl, "Synchronization of bacterial cultures in microsystem," *Micro Total Analysis Systems 2002, Proceedings of the MicroTAS 2002 Symposium*, Nara, Japan, pp. 835-837, 3-7 November 2002.
29. L.-S. Jang, D. R. Meldrum, M. R. Holl, "An active mixer for microscale DNA purification and sequencing reaction clean-up," *Micro Total Analysis Systems 2002, Proceedings of the MicroTAS 2002 Symposium*, Nara, Japan, pp. 239-241, 3-7 November 2002.
30. D. R. Meldrum, M. Holl, P. Seriburi, S. Phillips, S. Chao, L. Jang, F. Kosar, "MEMS modules for life-on-a-chip," *IEEE International Symposium on Circuits and Systems*, Bangkok, Thailand, pp. 111638-111641, May 2003 [invited].

31. Deirdre R. Meldrum, Charles Fisher, Matthew Moore, Mohan Saini, Mark Holl, William Pence, Stephen Moody, David Cunningham, and Peter Wiktor, "ACAPELLA-5K, A high-throughput automated genome and chemical analysis system," *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS) 2003*, Las Vegas, pp. 3:2321-2328, October 2003 [invited].
32. J. Koschwanetz, M. Holl, M. McMurray, D. Gottschling, D. Meldrum, "Automation of yeast pedigree analysis", *Proceedings of the IEEE International Conference on Robotics and Automation*, New Orleans, LA, pp. 1475-1480, April 27-30, 2004.
33. S. H. Chao, M. R. Holl, J. H. Koschwanetz, R. H. Carlson, L. S. Jang, and D. R. Meldrum "Velocity Measurement in microchannels with a laser scanning microscope and particle linear image velocimetry", *Proceedings of the ASME 2nd International Conference on Microchannels and Minichannels ICMM2004*, Rochester, New York, pp. 925-930, June 17, 2004.
34. M. R. Holl, T. H. Fung, G. I. Ball, S. C. McQuaide, S. H. Chao, A. Coleman-Lerner, O. Resnekov, S. Hawley, J. H. Koschwanetz, R. Yu, D. Endy, R. Brent, and D. R. Meldrum "Fluidic Systems for Realtime Microscopy Based Stimulus Response Experiments." *2nd Annual Alpha Project Research Symposium, Molecular Sciences Institute*, June 2004.
35. S. H. Chao, M. R. Holl, J. H. Koschwanetz, R. H. Carlson, and D. R. Meldrum "Transient microfluidic velocity measurement and particle characterization with a laser scanning confocal microscope", *Proceedings of the MicroTAS 2004, the 8th International Conference on Miniaturized Systems for Chemistry and Life Sciences*, Malmo, Sweden, pp. 641-643, September 26-30, 2004.
36. Tracy H. Fung, Gregory I. Ball, Sarah C. McQuaide, Shih-hui Chao, Alejandro Coleman-Lerner, Mark R. Holl, Deirdre R. Meldrum, "Microprinting of on-chip cultures: patterning of yeast cell microarrays using concanavalin-A adhesion," *Proceedings of the ASME International Mechanical Engineering Congress*, Anaheim, CA, pp. 373-374, November 13-20, 2004 [finalist for best student paper award].
37. Patrick Ngatchou, Charles Fisher, Mohan Saini, Mohamed El-Sharkawi, Deirdre Meldrum, "Application of neural network encoder for gene quantitation from real-time polymerase chain reaction experiments," *Proceedings of the IEEE International Workshop on Genomic Signal Processing and Statistics (GENSIPS) 2005*, Newport, Rhode Island, May 22-24, 2005.
38. Diego Barrettino, Maria Elena Martin, Sarah McQuaide, Deirdre Meldrum, "CMOS readout and control architecture for single-cell real-time Microsystems," *IEEE International Symposium on Circuits and Systems*, Kobe, Japan, May 23-26, 2005.
39. Chao, S. H., M. R. Holl, J. H. Koschwanetz, P. Seriburi, and D. R. Meldrum, "Scaling for microfluidic mixing," *Proceedings of the ASME 3rd International Conference on Microchannels and Minichannels, ICMM2005-75236*, Toronto, Canada, pp. 329-336, June 13-15, 2005.
40. Kerwin Wang, Mike Sinclair, Karl F. Böhringer, Deirdre Meldrum, "Using Nano Polystyrene Beads as Dampers in Micro-Scanning Mirrors for Photodynamic Therapy", *Micro Nano Breakthrough Conference (MNBC)*, Portland, OR, July 25-28, 2005. Paper. Poster.
41. Andrew Miller, Matthew Stanton, Carissa Sanchez, Xiaohong Li, Sarah McQuaide, Brian Reid, Deirdre Meldrum, Thomas Paulson, and Mark Holl, "Biopsy preparation for flow analysis using microfabricated disaggregation blades," *IEEE Conference on Automation Science and Engineering*, Edmonton Alberta, August 1-2, 2005.
42. Deirdre Meldrum, Mark Holl, Charles Fisher, Mohan Saini, Shawn McGuire, Timothy Ren, William Pence, Stephen Moody, David Cunningham, Douglas Donaldson, Peter Wiktor, "Sample preparation in glass capillaries for high-throughput biochemical analyses," *IEEE Conference on Automation Science and Engineering*, Edmonton Alberta, August 1-2, 2005.

43. John Koschwanez, Mark Holl, Robert Carlson, Michael McMurray, Daniel Gottschling, Deirdre Meldrum, "Automated lifetime analysis of a single yeast cell," *IEEE Conference on Automation Science and Engineering*, Edmonton Alberta, August 1-2, 2005.
44. P. Seriburi, A. Shastry, A. Van't Wout, J. Mittler, S. H. Chao, J. H. Koschwanez, and D. R. Meldrum "Lower limits of detection for single biological particles using impedance spectroscopy" *Proceedings of ASME 2nd Conference on NANO2005 Integrated Nanosystems: Design, Synthesis & Applications*, NANO2005-87060, Berkeley, CA, September 15-16, 2005.
45. P. Seriburi, A. C. Young, M. Witkowski, R. H. Carlson, and D. R. Meldrum, "Fabrication of PDMS Nanostructures with a Microstereolithographic Master", Nanoscale Science and Technology Workshop, University of Washington, Seattle, WA, September 20-21, 2005.
46. Robert Carlson and Deirdre Meldrum, "Electrostatic actuators composed of extensible graphite-PDMS composite membranes," *Ninth International Conference on Miniaturized Systems for Chemistry and Life Sciences (μ TAS)*, Boston, Massachusetts, October 9-13, 2005.
47. Robert Carlson, John Koschwanez, and Deirdre Meldrum, "Novel Material Patterning for Electronic, Magnetic, and Optical Components on PDMS", Ninth International Conference on Miniaturized Systems for Chemistry and Life Sciences (μ TAS), Boston, Massachusetts, October 9-13, 2005.
48. Barry Lutz and Deirdre Meldrum, "Hydrodynamic tweezers: single-cell trapping arrays for cell dynamics," *Ninth International Conference on Miniaturized Systems for Chemistry and Life Sciences (μ TAS)*, Boston, Massachusetts, October 9-13, 2005.
49. Shih-hui Chao, Mark Holl, Ling-sheng Jang, and Deirdre Meldrum, "Three-dimensional microfluidic flow field characterization with partial image velocimetry and laser scanning confocal microscopy," *Ninth International Conference on Miniaturized Systems for Chemistry and Life Sciences (μ TAS)*, Boston, Massachusetts, pp. 109-111, October 9-13, 2005.
50. S. H. Chao, M. R. Holl, S. C. McQuaide, and D. R. Meldrum "Oxygen concentration measurement with a phosphorescence lifetime based micro-sensor array using a digital light modulation microscope", *SPIE Conference on Imaging, Manipulation and Analysis of Biomolecules, Cells, and Tissues*, 6088-28, San Jose, CA, January 22-27, 2006.
51. Sarah C. McQuaide, Mark R. Holl, Lloyd Burgess, Timothy Molter, Joseph Dragavon, A. Cody Young, Timothy Strovas, Judith Anderson, Alex Jen, Brandon Karlsgodt, Mary Lidstrom, and Deirdre Meldrum, "A living cell array (LCA) for multiparameter cell metabolism studies," *IEEE/RAS-EMBS International Conference on Biomedical Robotics and Biomechatronics: BioRob2006*, Pisa, Italy, February 20-22, 2006.
52. John Koschwanez, Jim Wolfe, Mark Holl, Robert Carlson, and Deirdre Meldrum, "Automated, Biomechatronic System to Study Single Cell Aging," *IEEE/RAS-EMBS International Conference on Biomedical Robotics and Biomechatronics: BioRob2006*, Pisa, Italy, February 20-22, 2006.
53. S. H. Chao, T. H. Ren, S. A. Gales, M. R. Holl, S. C. McQuaide, and D. R. Meldrum, "Automated digital light modulation microscope (DLMM) for living cell array analysis: pattern recognition and spatial alignment", *IEEE/RAS-EMBS International Conference on Biomedical Robotics and Biomechatronics: BioRob2006*, Pisa, Italy, February 20-22, 2006.
54. S. H. Chao, T. J. Strovas, T. M. Wang, K. A. Jones-Isaac, S. L. Fink, B. T. Cookson, D. R. Meldrum "High-throughput, long-term imaging of salmonella infecting macrophages in a micro-environmental system", *ASME 4th International Conference on Nanochannels, Microchannels and Minichannels*, ICNMM2006-96212, June 2006.

55. T. H. Fung, S. H. Chao, J. E. T. Peach, D. R. Meldrum "Liquid Crystal Thermography of an On-Chip Polymerase Chain Reaction Micro-thermocycler", *ASME 4th International Conference on Nanochannels, Microchannels and Minichannels*, ICNMM2006-96175, June 2006.
56. Shih-hui Chao, Tim J. Strovas, Shile Zhang, Kendan A. Jones-Isaac, and Deirdre R. Meldrum, "Single-cell information extraction and viability analysis using automated microscopy," *IEEE 3rd International Conference on Automation Science and Engineering*, Shanghai, China, October 8-10, 2006.
57. Shih-hui Chao, Robert Carlson, and Deirdre Meldrum, "Soft Lithography without Using Photolithography," *Tenth International Conference on Miniaturized Systems for Chemistry and Life Sciences (μ TAS)*, Tokyo, Japan, No. 1726, November 5-9, 2006.
58. John Koschwanez, Robert Carlson, and Deirdre Meldrum, "Single Cell Capture with Ferromagnetic Elements Grown on PDMS," *Tenth International Conference on Miniaturized Systems for Chemistry and Life Sciences (μ TAS)*, Tokyo, Japan, No. 1727, November 5-9, 2006.
59. Barry R. Lutz, Jian Chen, Daniel T. Schwartz, and Deirdre R. Meldrum, "Trapping & chemical dosing of suspended cells in hydrodynamic tweezer arrays," *Tenth International Conference on Miniaturized Systems for Chemistry and Life Sciences (μ TAS)*, Tokyo, Japan, November 5-9, 2006.
60. Samuel Kim, Ehsan Saeedi, Deirdre Meldrum, Babak Parviz, "Self-assembled heterogeneous integrated fluorescence detection system," *Proceedings of 2nd Annual IEEE International Conference on Nano/Micro Engineered and Molecular Systems IEEE NEMS 2007*, Bangkok, Thailand, January 16-19, 2007 [won Best Paper Award for the conference]
61. Pahnit Seriburi, Ashutosh Shastry, Tim Ren, Steven Gales, Karl Bohringer, and Deirdre Meldrum, "Using electric cell-substrate impedance sensing to discriminate two individual adherent cell populations," *Proceedings of Transducers 2007 The 14th International Conference on solid-state sensors and actuators*, Lyon, France, June 10-14, 2007.
62. Shih-hui Chao, Robert Carlson, and Deirdre Meldrum, "Fabrication of lenses with high light-collecting ability using water molds," *Proceedings of ASME ICNMM2007 5th International Conference on Nanochannels, Microchannels, and Minichannels*, Puebla, Mexico, June 18-20, 2007.

Non-journal abstract refereed publications

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.
8. D. R. Meldrum, H. T. Evensen, W. H. Pence, S. E. Moody, D. L. Cunningham, N. A. Friedman, E. B. Arutunian, and M. Saini, "Introduction of the ACAPELLA-5K Automated Fluid Sample Handling System," *Sixth International Conference on Automation in Mapping and DNA Sequencing*, the Sanger Centre, Hinxton, England, September 1-4, 1999.
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.

students I supervise; research engineer/scientist I supervise; speaker(s) is underlined

2.3 Books and Editing

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.

Book contribution

1. L. Ritter and S. Ambrose, A Woman's Guide to Navigating the Ph.D. in Engineering and Science, IEEE Press, to appear 2001. I contributed some brief articles for this book.

student I supervised

2.4 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.

research engineer I supervised

2.5 Miscellaneous

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 Number 5,785,926, July 28, 1998 (filed September 19, 1995).
2. R. Kraft, N. A. Friedman, D. Meldrum, R. Seubert, "Precision Small Volume Fluid Processing Apparatus and Method," Patent Number 6,218,193 B1, April 17, 2001 (filed June 30, 1998).

Patents submitted

1. D. Meldrum, W. G. Hol, S. Turley, C. H. Fisher, and S. Moody, "Method for automated preparation of capillary-based samples for protein crystallography," provisional patent filed Autumn 2002, patent filed Autumn 2003.
2. M. R. Holl, A.K. Miller, M. L. Stanton, C. A. Sanchez, T. G. Paulson, B. J. Reid, D. R. Meldrum, "Tissue Disaggregator for Small Biopsies," provisional patent filed 05/14/2003, patent filed 05/2004.
3. John Koschwanez, Mark Holl, Robert Carlson, Lloyd Burgess, Michael McMurray, Daniel Gottschling, Deirdre Meldrum, "Automated Yeast Pedigree Analysis System and Methods," patent filed 04/26/2005.
4. Sarah McQuaide, Timothy Molter, Mark Holl, Joseph Dragavon, Lloyd Burgess, Mary Lidstrom, Deirdre Meldrum, "Real-Time Automated Single Cell Oxygen Consumption Monitoring," provisional filed 10/2006.
5. Shih-hui Chao, Robert Carlson, Deirdre Meldrum, "Fabrication of High-Quality Microscale Plastic Lenses Using Water Molds," provisional filed 12/2006.
6. Samuel Kim, Babak Parviz, Deirdre Meldrum, "Self Assembled Integrated Fluorescence Detection Device," patent filed, 01/2007.

Patents for research I supervised

1. Harold T. Evensen and David L. Cunningham, "Piezo-ceramic actuator-driven mixing device," Patent Number 5,890,802, April 6, 1999 (filed February 20, 1998).
2. Lauren Sjoboen, "Jam resistant dispenser for capillary tubes and the like," Patent Number 6,102,249, August 15, 2000 (filed February 20, 1998).

3. Other Scholarly Activity

3.1 Invited Lectures and Seminars

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, Elec. Engr. Corporate Day, "Improving the speed and precision of automation for DNA sequencing," Apr. 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 Elec. Engr., 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 & 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, "Cytometric microsystems for eukaryotes and prokaryotes", San Diego, California, May 3-9, 2002 [invited plenary].

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

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 [invited participant].

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, "MEMS modules for life-on-a-chip," Feb. 6, 2003 [invited plenary].

National Academy of Engineering Regional Symposium, "Life-on-a-chip," with Mary Lidstrom, University of Washington, March 13, 2003 [invited plenary].

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 [invited].

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, "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 [invited].

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 [invited].

Taiwan National Science Council and National Taiwan University, Taipei, "Life-on-a-chip," December 17, 2003 [invited].

Taiwan National Science Council and National Taiwan University, Taipei, "High-throughput automation for functional genomics," December 19, 2003 [invited].

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

Advances in Genome Biology and Technology, "Detecting response at the cellular level," Feb. 7, 2004 [invited plenary].

NIH NHGRI Council, "Microscale Life Sciences Center," Feb. 9, 2004 [invited].

University of Colorado, Boulder, Department of Chemistry Colloquium, "Detecting response at the cellular level," Feb. 16, 2004 [invited].

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 [invited].

NIH NIGMS Protein Production and Crystallization Workshop, Bethesda, Maryland, "High-throughput, capillary-based protein crystallography," March 29-31, 2004 [invited].

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 [invited].

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 [invited].

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. [invited – workshop to assess the state of robotics in the US].

UW Center for Workforce Development, "The Academic Job Search," October 19, 2004 [invited].

The 22nd Annual Conference on Biomedical Engineering Research, the 2005 HSEMB (Houston Society for Engineering in Medicine and Biology) Conference, Houston, Texas, "Life-on-a-chip," February 11, 2005 [invited plenary].

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

The Ocean Dialogues, UW School of Oceanography, "Ecogenomics" (joint presentation with Dr. Ginger Armbrust), April 6, 2005 [invited].

UW Robotics, Controls, and Mechatronics Colloquium, College of Engineering, "Microscale systems for single cell analysis: life-on-a-chip," June 3, 2005 [invited].

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 [invited].

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, “Multi-parameter genomic sensing in the ocean,” November 7-8, 2005 [invited plenary].

3rd 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.

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, Università 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.

Distinguished Lecture, Queens University, Kingston, Ontario, Canada, “Life-on-a-chip for Ecogenomics,” March 29, 2007.

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

3.2 Professional Society Memberships

Fellow, A.A.A.S., 2003-present

Fellow, IEEE, 2004-present

Member, A.A.A.S., 1992-present.

Member, AIAA, 1992-present.
Member, American Chemical Society, 1999 - present
Member, ASCE, 1980-1985.
Member, AWIS, 1996-present.
Member, HUGO (Human Genome Organization), 2001-present.
Member, IEEE, 2000-present; Member 1993 – 2000
Engineering, Medicine, and Biology Society, 1992-present.
Computer Society, 1992-present.
Control Systems Society, 1987-present.
Education Society, 1992-present.
Electron Devices Society, 1997-present.
Robotics & Automation Society, 1987-present.
Systems, Man, and Cybernetics Society, 1987-present.
Vehicular Technology Society, 1992-present
Member, SAE, 1993-1996.
Member, Sigma Xi, 1994-present.
Member, SWE, 1980-present.

3.3 Professional Society and Other Service

Society offices held and committee memberships

President, UW Student Chapter of SWE, 1981-82.
Regional Representative, SWE, 1982-83.
Vice President, UW Student Chapter of ASCE, 1981-83.
JPL Professional Representative to SWE, 1985-87.
Faculty Advisor, UW Student Chapter of SWE, 1995-2006.
Member, IEEE Robotics & Automation Technical Committee on Automation, 3/97-present.
Region 6 Representative, IEEE Engineering, Medicine, & Biology Society (EMBS) Advisory Committee, 1999-2000.
Professional Activities Committee (PACE) Chair, IEEE Engineering Medicine & Biology Society (EMBS), 1999.
United States 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), July 2002-pres.
Steering Committee Representative for IEEE Robotics and Automation Society to the IEEE Transactions on NanoBioscience, September 2002- pres.
Member, EMBS Technical Committee on Biomedical Robotics, October 2003-present.
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, February 2006.

Conference organizing/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, 1st 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 1st IEEE/RAS-EMBS International Conference on Biomedical Robotics and Biomechanics: BioRob2006, Pisa, Italy, February 20-22, 2006.

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

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

Program Chair, 2nd 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, 3rd IEEE International Conference on Automation Science and Engineering (CASE), Phoenix, Arizona, October, 2007.

General Chair, 2nd IEEE/RAS-EMBS International Conference on Biomedical Robotics and Biomechanics: BioRob2008, Phoenix, Arizona, February 2008.

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," 1st IEEE International Conference on Automation Science and Engineering (CASE), Edmonton, Alberta, August 1-2, 2005.

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

Other

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

3.4 Other

Work as a referee

Journal Editorships

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

Journals

AIAA Journal of Guidance, Control, and Dynamics, 1992-present.
 Annals of Biomedical Engineering, 1994.
 IEEE/ASME Transactions on Mechatronics, 1997-present.
 IEEE Control Systems Magazine, 1992-present.
 IEEE Transactions on Education, 1997-present.
 IEEE Transactions on Robotics & Automation, 1987-present.
 Transactions of the ASME Journal of Dynamics, Systems, Measurement, and Control, 1988-92.
 Analytical Chemistry, 1998 – present.
 Genome Research, 1998 - present.
 Science, 1997 - present

BioTechniques, 1998 - present
Nucleic Acids Research, 2000 – present
IEEE Proceedings, 2000 – present
IEEE Spectrum, 2000 – present
Genomics, 2000 – present
Annual Review of Biomedical Engineering, Editorial Committee for Volume 3, 2001
IEEE Transactions on Automation Science and Engineering, 2004-present.

Conferences

Advances in Genome Biology and Technology (AGBT), 2001 - present.
American Control Conference, 1988-present.
IEEE/ASME International Conference on Advanced Intelligent Mechatronics, 1997-present.
IEEE Conference on Automation Science and Engineering, 2005- present.
IEEE Conference on Decision and Control, 1988-present.
IEEE International Conference on Engineering in Medicine and Biology Society, 1993-present.
IEEE International Conference on Robotics and Automation, 1988-present.
IEEE International Symposium on Circuits and Systems, 2002-present.
IEEE Conference on Biomedical Robotics and Biomechanics, 2004.
IEEE/RAS-EMBS International Conference on Biomedical Robotics and Biomechanics
International Conference on Mechatronics, 2002-present.
International Conference on Intelligent Robotics and Systems (IROS), 2003
Micro Total Analysis Systems Symposium, 2001 – present.

Book reviews

Understanding Electro-Mechanical Engineering: Technology, Devices and Design by Lawrence J. Kamm for the IEEE Press, 1995.

Grant 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-present.

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 & 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, September 11-12, 2005.

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

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

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

HHS National Human Genome Research Advisory Council, February 12-13, 2007.

4. Graduate Students

4.1 Chaired Doctoral Degrees

Student Name	Dissertation Title	Date
Ling-Sheng Jang (ME)	Acoustic Microfluidic Mixing (Ph.D. complete)	08/03
Euphoria Gibbons (Chem)	DNA Sequencing with No Net Migration (Ph.D. complete)	08/05
Patrick Ngatchou	Intelligent Techniques for Modeling & Optimization (Ph.D. complete)	08/06
John Koschwanez	Tools for Automated Lifetime Analysis of a Single Yeast Cell (Ph.D. complete)	12/06
Pahnit Seriburi	Electroimpedance spectroscopy of living cells (post-generals)	06/07
Samuel Kim	Integrated fluorescence detection system (post-quals)	12/07

4.2 Chaired Masters Degrees

Student Name	Thesis Title	Date
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:	08/96

	Signal Normalization and Structural Pattern Recognition	
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 Fettah 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 (post-quals)	06/03
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

4.3 Other Significant Student Supervision

Ph.D. committees

Student Name	Dissertation Title	Date
Brett Van Steenwyk (AA)	A Reliable Algorithm for Optimal Control Synthesis	02/93
Yen-Hao Tseng	Neural Network Technique for Invariant Recognition and Motion Estimation of Three-Dimensional Objects Using Range Data	02/95
Pierre-Henry Marbot	In Response of a Mechanical Spindle Replica	06/95
Ching-Ping Chou	Study of Human Motion Control with a Physiology Based Robotic Arm and Spinal Level Neural Controller	06/96
David Bossert (AA)	Design and Application of Robust Reduced-Order Hybrid Position and Force Control for a Two-Link Flexible Manipulator	05/96
Pietro Buttolo	Characterization of Human Pen Grasp with Haptic Displays	05/96
Dal-Yeon Hwang	Teleoperation Performance with Kinematic Redundancy	11/95
Jasit Surit	Automatic Boundary Estimation of Constrained Motion Perturbed Shapes: An Application in Cardiology	04/97
Michael VanHilst (CSE)	Role Oriented Programming for Software Evolution	09/97
Kyung-Im Son	A Multi-Class Multi-Dimensional Classifier as a Topology Selector for Analog Circuit Design (general exam 04/96; final exam 05/97/98)	06/98
Steven Craig Venema	Experiments in Surface Perception using a Fingertip Haptic Display (general exam 05/96; final exam 03/99)	03/99
Kevin P. Hinshaw (CSE)	Seeing Structure: Using Knowledge to Reconstruct and Illustrate Anatomy (general exam 05/97)	04/00
Paul E. DeVries (CivE)	Scour in Low Gradient Gravel Bed Rivers: Patterns, Processes, and Implications for the Survival of Salmonid Embryos (general exam 06/97)	12/99
Ming-Chieh Huang	Silicon microfabricated device for non-sheath flow cytometer (general exam 09/97; final exam 03/99)	03/99
Kalev Sepp	Active Noise Control Using Acoustic Grillage (general exam 11/97)	12/00
Victor Moore	Behavioral Recognition in Mobile Robots using Passive & Active Observations (generals 3/10/98)	TBD
Richard Adams	Design of Virtual Coupling Networks for Stable Haptic Interaction with Virtual Environments (generals 4/98)	08/99

Thavida Maneewarn	Haptic Feedback of Manipulator Kinematic Conditioning For Teleroperations (generals 12/02/98)	03/00
Tim Chinowsky	A Capillary-Based Chemical Sensor Combining Surface Plasmon Resonance and Bulk Refractometry (generals 6/99)	06/01
Kristin Jaax (BioE)	A Robotic Muscle Spindle: Modelling, Performance, and Application to Ensemble Response (generals 9/6/2000)	12/01
Zachary Wall	Traffic Control (generals 4/3/2002)	TBD
Mohammad A. Al-Yagout	Improving Traffic Characterization to Enhance Pavement Design and Performance (generals 7/16/2003; final 12/2003))	12/03
Greg Lee	Low Power Haptic Devices: Ramifications on Perception & Device Design (generals 4/24/2003)	06/04
J. Fettah Kosar (BioE)	Nanofluidic Delivery Device for Probing Single Cells (Albert Folch, advisor)	06/05
Chia-Hsien Hsu (ME)	Lab on a soft chip: Elastomeric Microfluidic Devices for Biological Studies (generals 4/27/2005; final 03/06/2006; advisor, Albert Folch)	03/06
Alan Hamlet (CEE)	Hydrologic Implications of 20 th Century Warming and Climate Variability in the Western U.S. (Dennis Lettenmaier, advisor; final 05/01/2006)	05/06
Jiandong Fang	Self-Assembly Techniques for Massively Parallel Packaging Of MEMS Devices (Karl Bohringer, advisor; final exam 05/31/06)	05/06
Carlos Araya (Genome Sciences)	DNA-based counters (Stan Fields, advisor; Generals Exam 6/19/06)	TBD
Jianhua Li (Civil Engineering)	Calibration and Application of Analytical Tools for the Washington State Department of Transportation Road Network (Joe Mahoney, advisor)	12/06

Ph.D. qualifying exam committees

Student Name	Exam Title	Date
David Bailey	Analysis of a Shunting Inhibitory Network	Winter `94
Steven Craig Venema	Feedback vs. Feedforward Linearization	Winter `95
Kalev Sepp	Loop-by-Loop Design vs. Direct MIMO Design for Robotic Manipulators	Winter `95
Haichen Xu	Review of Hidden Markov Model and Its Application in Speech Recognition	Winter `95
Victor Moore	Simulation of an Observer Robot, Actor Robot, and an Environment	Winter `95
David McGrane	Application of Artificial Neural Networks to	Winter `95

	Flight Control	
Pietro Buttolo	Interfacing Force Displays to the Internet	Spring `95
William G. Vlases (AA)	Depth Exam in Control Systems	Spring `95
Thavida Maneerwan	Kinematic Doability	Spring `96
James Droppo	Modern Recursive, Stochastic Gradient Filters	Winter `97
Ibrahim Hallaj	Tomography	Spring `97
Richard Adams	Control of Flexible Robot Manipulators with Application to Haptic Displays	Spring `97
Frank Holman	Classification of 3D Objects from Images Using Both Neural Networks and Fuzzy Logic	Autumn `97
Jeanne Fehlauer (BioE)	Establishing Surface Plasmon Microscopy as a Label-Free Technique for Reading DNA Arrays	Winter '98
Supavadee Aramvith	Content-Based Video Retrieval System	Winter '98
Vladimir Brayman	Effective Bandwidth for Charging and Accounting	Spring `98
G. Chrysanthakopoulos	Applications of Neural Networks to Telecommunications	Summer '98
Jaehoon Kwon	Application of Cramer-Rao Bound to Medical Signal Analysis Problems	Summer '98
Zachary Wall	Controls & Robotics fundamentals	Autumn '98
Uday Gandikota	Controls & Robotics fundamentals	Spring 2000
Chun-I Chen Greg Lee	Controls & Robotics fundamentals	Autumn 2000
Shane Cantrell Bing Jiang	Controls & Robotics fundamentals	Spring 2002
Shane Cantrell Jesse Doshier Mitch Lum Sam McKennoch John-Michael McNew	Controls & Robotics fundamentals	Spring 2003
	Controls & Robotics fundamentals	Spring 2004
	Controls & Robotics fundamentals	Autumn 2005

Masters committees

Student Name	Thesis Title	Date
Melani Shoemaker	A Study and Model of the Role of the Renshaw Cell	05/93

	in Regulating the Transient Firing Rate of the Motorneuron	
Brian Viet Lieu	Multiple Scan Joint Probabilistic Data & Maneuver Association: A Tracking Algorithm for Multiple Maneuvering Targets in Clutter Environment	08/93
David Sean Smith	Kinematic Do-Ability for Manipulator Analysis	12/93
Karl Chrisman (ME)	A Coplanar Pole Balancing on a Pivoting Arm	05/94
Steven C. Venema	A Kalman Filter Calibration Method for Analog Quadrature Position Encoders	06/94
Frederik Boe	An Iterative Trajectory Shaping Algorithm Based on Run Time Results	06/94
Nancy Greivell (BioE)	Design of a Ferrofluid Magnetic Pipet for Submicroliter Liquid Handling	05/95
Manuel Moreyra	Design of a Planar High Bandwidth Force Display with Force Sensing	08/96
Jason Trujillo	Haptic Considerations in the Design of the Force Reflective Endoscopic Grasper: Enhancing the Sense of Touch in Minimally Invasive Surgery	05/97
Nick Hardman	A Reconfigurable Hardware Test Bed for Elastically-Coupled Systems	12/97
Frank Metting	Three Dimensional Dynamic Simulation of a Running Quadruped Robot	02/99
Sidarta Goyal	Exploring Textured Surfaces and Electrowetting Phenomena for Microscale Bioanalytical Systems	06/04

4.4 Other Significant Supervision

Research Assistant Professor

Name	Project Title	Date
Mark Holl, Ph.D.	Microfabrication/microfluidics for Genome Analysis University of Washington Arizona State University	7/01-12/06 01/07-pres.

Research Engineer (Professional Staff)

Name	Project Title	Date
Cynthia E. Taylor, M.S.	Fuzzy Logic Ramp Metering Control Design & Implementation for the Seattle Freeway	7/94-2/00
Mark Holl, Ph.D.	Microfabrication/microfluidics for Genome Analysis	8/99-6/01
Matthew Moore, M.S.	Software development for Genomation: user-interface, machine control, imaging, web design	3/00-6/01

Deirdre R. Meldrum

03/05/07

Jennifer Jaiteh (75%)	Systems Administrator for Computing	10/02-12/06
Timothy Ren, B.S.	Software engineering for genomation systems (now at Microsoft)	1/03-7/06
Sarah McQuaide	Microfabrication engineer for Microscale Life Sciences	1/03-12/06
Shawn McGuire	Electromechanical engineer for protein crystallography and automated sample preparation	08/03-12/06
Steven Gales	Software engineering for genomation systems (now at Microsoft)	09/04-12/06

Research Associate (Post-Doc)

Name	Project Title	Date
Harold Evensen, Ph.D.	Genome Automation	7/96-6/99
Joseph Chao, Ph.D.	Microscale Life Sciences – living cellular array scanner University of Washington Arizona State University	06/02-12/06 01/07-pres.
Barry Lutz, Ph.D.	Microscale Life Sciences – acoustic trapping of cells (now at Intel)	02/04-07/06
Diego Barrettino, Ph.D.	Microscale Life Sciences – CMOS integrated systems (now at ETH, Zurich)	04/04-08/05
Jaeyoung Choi, Ph.D.	UW/PNNL Fellow – Cellular absorptive tracers	03/04-09/05

Research Scientist (Professional Staff)

Name	Project Title	Date
Mohan Saini, Ph.D.	Biochemistry: reducing reaction volumes, protocol optimization, new experiment design	9/98-12/06
Charles Fisher, Ph.D.	Optics and electronics for genome instrumentation	1/00-12/06
Robert Carlson, Ph.D.	Microscale Life Sciences & Proteomics	4/03-12/04

Senior Research Scientist (Professional Staff)

Name	Project Title	Date
Robert Carlson, Ph.D.	Microscale Life Sciences & Proteomics	1/05-pres.

Visiting Scientists

Name	Project Title	Date
Jean Peccoud, Ph.D.	Statistics of real-time quantitation for PCR (from INSERM, Grenoble, France)	1/98-12/99
Michel Cuendet, M.S.	Analysis and estimation of estimator for real-time quantitative PCR (from Univ. of Lausanne, Switzerland)	7/00-10/00
Stephen Phillips, Ph.D.	Micoscale life sciences (from Case Western Reserve University)	8/02-01/03

Elena Martin, Ph.D.	Thermal & microfluidic modeling (from Spain)	07/04-08/05
Robin Luo, Ph.D.	Ion channel Microsystems (from National Cheng Kung University, Taiwan)	summer2005

Electro-Mechanical Engineer

Name	Project Title	Date
Aaron Torok	Test the Acapella-5K and support the Genomation Lab	4/00-10/00
Andrew Cookson	Test the Acapella-5K and support the Genomation lab	1/01 – 3/03
Jeff Houkal	Microscale devices for genomics University of Washington Arizona State University	01/05-12/06 01/07-pres.

Program Manager

Name	Project Title	Date
Karen Fisher	Acapella-5K Advanced Development Microscale Lifes Sciences Center	2/00 – 12/06 8/01 – 12/06

5. Research Activities**5.1 Sponsored Research****Current sponsored research**

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.

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

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, **funded**, 05/01/02 - 4/30/07.

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**, 09/01/03-08/31/07.

NIH National Cancer Institute, 1 R21/R33 CA112149, "Automated cell preparation in tubes for 3D microscopy," \$1,573,171 (direct), \$2,131,100 (with indirect), PI, **funded**, 04/01/05-3/31/08.

HHMI Med into Grad Initiative Program, number TBD, "Molecular Medicine Training Program at the University of Washington," \$xx (direct), \$xx (with indirect), PI Nancy Maizels (D. Meldrum, investigator and member of Executive Committee), **funded**, multidisciplinary grant with Nancy Maizels, Ph.D., Program Director (Immunology and Biochemistry); Peter Byers, M.D., Co-Director (Pathology and Medicine); Wylie Burke, M.D., Ph.D. (Chair, Medical History & Ethics); Stan Fields, Ph.D. (Genome Sciences and Medicine); Stan McKnight, Ph.D.

(Pharmacology); Deirdre Meldrum, Ph.D. (Electrical Engineering and Mechanical Engineering); Ray Monnat, M.D. (Pathology and Genome Sciences); Maynard Olson, Ph.D (Acting Head of the Division of Medical Genetics; Medicine and Genome Sciences); Henk Roelink, Ph.D. (Biological Structure; Director, Molecular and Cellular Biology Graduate Program); and Henry Rosen, M.D. (Associate Chair, Department of Medicine), 01/01/06-12/31/10.

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 – 04/30/2007.

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.

6. Teaching

6.1 Undergraduate and Graduate Courses Taught

Courses Taught and Teaching Ratings

Year	Qtr	Course	Brief Title, (Credits), # Students
1993	Win.	EE543	Introduction to Robotics, (4), 12
1993	Spr.	EE/AA549	Identification & Estimation, (3), 20
1994	Spr.	EE/AA549	Identification & 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 (lines 1,3,4 -textbook excluded)
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 & Genomics for Engineers, (3), 19
2004	Win.	EE546B	Biology & Genomics for Engineers, (3), 8
		EE400M	Biology & Genomics for Engineers, (3), 4
2005	Win.	EE546B	Biology & Genomics for Engineers, (3), 16
2005	Win.	EE400B	Biology & Genomics for Engineers, (3), 7
2006	Win.	EE546A	Biology & Genomics for Engineers, (3), 10
2006	Win.	EE400A	Biology & Genomics for Engineers, (3), 4

9/93-8/98 I was restricted to teaching one course per year by my NIH SERCA training grant. class size limited due to lab facility constraints

Student Project Supervision and Seminars Organized

Year	Qtr	Course	Brief Title, (Credits), # Students
1993	Win.	EE499A	Special Projects, (2), 1
1994	Win.	EE500T	Robotics Colloquium, (1), 18
1994	Win.	EE599A	Selected Topics in EE, (2), 1
1994	Win.	EE700A	Masters Thesis, (6), 1; (9), 1
1994	Spr.	EE600A	Independent Research, (6), 1
1994	Sum.	MITE	Minority Intro. to Engr., 20
1994	Sum.	EE599A	Selected Topics in EE, (5), 1; (5), 1
1994	Sum.	EE600A	Independent Research, (4), 1
1994	Aut.	EE500R	Robotics Colloquium, (1), 18
1994	Aut.	EE600A	Independent Research, (1), 1; (2), 1; (5), 1
1995	Win.	EE600A	Independent Research, (6), 1
1995	Spr.	EE599A	Selected Topics in EE, (4), 1
1995	Spr.	EE600A	Independent Research, (9), 1
1995	Spr.	EE800A	PhD, (2), 1
1995	Sum.	EE700A	Masters Thesis, (9),1; (9),1; (9),1
1995	Sum.	EE700S	Masters Thesis, (4), 1
1995	Sum.	EE800A	PhD, (6),1
1995	Aut.	EE499A	Special Projects, (3),1
1995	Aut.	EE700A	Masters Thesis, (5),1; (3),1
1995	Aut.	EE700S	Masters Thesis, (7),1
1995	Aut.	EE800A	PhD, (4),1
1995	Win.	EE499A	Special Projects, (2),1
1996	Win.	EE599A	Selected Topics in EE, (2),1
1996	Win.	EE700A	Masters Thesis, (6),1; (9),1; (3),1
1996	Win.	EE700S	Masters Thesis, (1),1
1996	Win.	EE800A	PhD, (4), 1
1996	Spr.	EE/AA591	Robotics and Controls Colloquium, (1), 18
1996	Spr.	EE599A	Selected Topics in EE, (3), 1
1996	Spr.	EE700A	Masters Thesis, (6),1; (9),1; (8),1
1996	Spr.	EE700S	Masters Thesis, (1), 1
1996	Spr.	EE800A	PhD, (4), 1
1996	Sum.	EE600A I	Independent Research, (3), 1
1996	Sum.	EE700A	Masters Thesis, (3), 1; (3), 1
1996	Sum.	EE700S	Masters Thesis, (2), 1
1996	Sum.	EE800A	PhD, (3), 1
1996	Aut.	EE700A	Masters Thesis, (2), 1
1996	Aut.	EE700S	Masters Thesis (1), 1
1996	Aut.	EE800A	PhD, (9), 1
1997	Win.	EE600A	Independent Research (3), 1; (7), 1
1997	Win.	EE700A	Masters Thesis, (7), 1
1997	Win.	EE800A	PhD, (7), 1
1997	Spr.	EE599A	Selected Topics in EE, (3), 1; (4), 1
1997	Spr.	EE800A	PhD, (6), 1
1997	Sum.	EE499A	Special Projects, (4), 1; (5), 1
1997	Sum.	EE599A	Selected Topics in EE, (4), 1; (3), 1
1997	Sum.	EE600A	Independent Research (3), 1
1997	Sum.	EE700A	Masters Thesis, (3), 1; (6), 1
1997	Aut.	EE499A	Special Projects, (4), 1; (3), 1
1997	Aut.	Bioen600A	Independent Research, (5), 1
1997	Aut.	EE700A	Masters Thesis (1), 1; (10), 1
1997	Aut.	EE800A	PhD, (4), 1; (10), 1
1998	Win.	EE499A	Special Projects, (4), 1; (2), 1
1998	Win.	EE600B	Independent Research, (4), 1
1998	Win.	Bioen600A	Independent Research, (6), 1

1998	Win.	EE800A	PhD, (10), 1
1998	Spr.	Bioen600A	Independent Research, (10), 1
1998	Spr.	EE700A	Masters Thesis (7), 1
1998	Spr.	EE800A	PhD, (2), 1; (2), 1
1998	Sum.	Bioen600A	Independent Research, (3), 1
1998	Sum.	EE700A	Masters Thesis (3), 1
1998	Aut.	Bioen600A	Independent Research, (5), 1
1998	Aut.	EE600S	Independent Research, (1), 1
1998	Aut.	EE700A	Masters Thesis (2),1; (5), 1
1998	Aut.	EE800A	PhD, (10), 1
1999	Win.	EE499A	Special Projects (4), 1; (2), 1
1999	Win.	EE800A	PhD, (5), 1
1999	Spr.	EE499A	Special Projects (3), 1
1999	Spr.	EE599A	Selected Topics in EE (2), 1
1999	Spr.	Bioen600A	Independent Research (10), 1
1999	Spr.	EE800A	PhD, (10), 1
1999	Sum.	Bioen600A	Independent Research, (3), 1
1999	Sum.	EE700A	Masters Thesis (3) 1
1999	Sum.	EE800A	PhD, (3), 1
1999	Aut.	EE700A	Masters Thesis (10), 1
1999	Aut.	Bioen600A	Independent Research, (10), 1
1999	Aut.	EE800A	PhD, (10), 1
2000	Win.	ENGR199A	Special Project, (2), 1
2000	Win.	Bioen599A	Special Topics Bioeng (3), 1
2000	Win.	Bioen600A	Independent Research (10), 1
2000	Win.	EE800A	PhD (10), 1
2000	Spr.	ENGR199A	Special Project, (2), 1
2000	Spr	Bioen599A	Special Topics Bioeng (4), 1
2000	Spr.	EE800A	PhD (10), 1
2000	Sum.	EE599A	Selected Topics in EE (3), 1
2000	Sum.	Bioen600A	Independent Research, (6), 1; (3), 1
2000	Sum.	EE700A	Masters Thesis (3), 1
2000	Sum.	EE800A	PhD (3), 1
2000	Aut.	EE599A	Selected Topics in EE (2), 1
2000	Aut.	EE700A	Masters Thesis (2), 1
2000	Aut.	EE800A	PhD (9), 1
2001	Win.	EE299A	Special Topics in EE (3), 1
2001	Win.	EE499A	Special Projects (2), 1
2001	Win.	Bioen600A	Independent Research (10), 1
2001	Win.	ME800A	PhD (9), 1
2001	Spr	EE499A	Special Projects (2), 1
2001	Spr.	ME800A	PhD (9), 1
2001	Spr	Bioen700A	Masters Thesis (5), 1
2001	Sum	EE700A	Masters Thesis (4), 1; (5), 1
2001	Sum	Bioen600A	Independent Research (3), 1
2001	Sum	Bioen700A	Masters Thesis (10), 1
2001	Sum	ME800A	PhD (5), 1
2001	Aut	EE499A	Special Projects (3), 1
2001	Aut	EE599A	Selected Topics in EE (5), 1
2001	Aut	ME800A	PhD (9), 1
2001	Aut	Bioen600A	Independent Research (10), 1
2001	Aut	Bioen700A	Masters Thesis (10), 1
2002	Win.	EE500N	Microscale Life Sciences Seminar (1), 36
2002	Win	EE599A	Selected Topics in EE (3), 1
2002	Win	ME800A	PhD (10), 1
2002	Win	Bioen600A	Independent Research (5), 1

2002	Win	Bioen700A	Masters Thesis (2), 1
2002	Spr.	EE500N	Microscale Life Sciences Seminar (1), 36
2002	Spr	EE600A	Independent Research (1), 1; (3), 1
2002	Spr	EE600B	Independent Research (4), 1
2002	Spr	EE700A	Masters Thesis (3), 1; (10), 1
2002	Spr	ME800A	PhD (9), 1
2002	Spr	Bioen700A	Masters Thesis (9), 1
2002	Sum	EE600A	Independent Research, (2), 1; (3), 1
2002	Sum	EE700A	Masters Thesis (3), 1
2002	Sum	Bioen700A	Masters Thesis (3), 1
2002	Sum	ME800	PhD (5), 1
2002	Aut	EE599A	Selected Topics in EE (1), 1
2002	Aut	EE600A	Independent Research, (6), 1; (7), 1
2002	Aut	EE700A	Masters Thesis (3), 1
2002	Aut	ME800	PhD (10), 1
2003	Win.	EE600A	Independent Research, (3), 1; (3), 1; (3), 1
2003	Win.	EE700A	Masters Thesis (7), 1
2003	Win.	ME800A	PhD (1), 1
2003	Spr.	EE299A	Special Topics in EE (2), 1
2003	Spr.	EE399A	Special Topics in EE (4), 1
2003	Spr.	EE499A	Special Projects (2), 1
2003	Spr.	EE600A	Independent Research (7), 1; (7), 1; (2), 1
2003	Spr.	EE700A	Masters Thesis, (9), 1; (6), 1; (3), 1
2003	Spr.	ME800A	PhD (2), 1
2003	Sum	EE499A	Special Projects (4), 1
2003	Sum	EE600A	Independent Research, (2), 1; (2), 1; (2), 1
2003	Sum	EE700A	Masters Thesis (2), 1; (3), 1
2003	Sum	EE800A	PhD (2), 1
2003	Aut	EE600A	Independent Research, (6), 1
2003	Aut	EE700A	Masters Thesis (2), 1; (6), 1
2003	Aut	EE800A	PhD (10), 1
2004	Win	EE599A	Selected Topics in EE (3), 1
2004	Win	EE600A	Independent Research (9), 1; (6), 1
2004	Spr	EE499A	Special Projects, (3), 1; (2), 1; (3), 1
2004	Spr	EE599A	Selected Topics in EE, (2), 1
2004	Spr	EE600A	Independent Research, (9), 1; (10), 1
2004	Spr	EE700A	Masters Thesis (6), 1
2004	Sum	EE499A	Special Projects (2), 1; (2), 1
2004	Sum	EE600A	Independent Research (5), 1
2004	Sum	EE700A	Masters Thesis (10), 1; (6), 1
2004	Aut	EE499A	Special Projects (2), 1; (3), 1
2004	Aut	EE599A	Selected Topics in EE (2), 1
2004	Aut	EE600A	Independent Research (3), 1; (10), 1
2004	Aut	EE700A	Masters Thesis (6), 1
2005	Win	EE599A	Selected Topics in EE (3), 1
2005	Win	EE600A	Independent Research (6), 1; (5), 1
2005	Win	EE700A	Masters Thesis (9), 1
2005	Spr	EE299A	Special Topics in Elec. Engr., (3), 1
2005	Spr	EE499A	Special Projects, (2), 1; (3), 1; (4), 1
2005	Spr	EE600A	Independent Research (10), 1; (7), 1
2005	Spr	EE700A	Masters Thesis (3), 1; (4), 1; (7), 1
2005	Sum	EE499A	Special Projects (4), 1
2005	Sum	EE599A	Selected Topics in EE (5), 1; (2), 1
2005	Sum	EE600A	Independent Research (5), 2
2005	Sum	EE700A	Masters Thesis (3), 1; (2), 1
2005	Aut	EE599A	Selected Topics in EE (5), 1

2005	Aut	EE600A	Independent Research (3), 1; (1), 1; (6), 1
2005	Aut	EE700A	Masters Thesis (5), 1; (3), 1; (10), 1; (3), 1
2005	Aut	EE800A	Doctoral Dissertation (10), 1
2006	Win	EE599A	Selected Topics in EE (4), 1; (5), 1
2006	Win	EE600A	Independent Research (3), 1; (5), 2; (10), 1
2006	Win	EE700A	Masters Thesis (3), 3; (10), 1
2006	Win	EE800A	Doctoral Dissertation (10), 1
2006	Spr	EE599A	Selected Topics in EE (1), 1; (5), 1
2006	Spr	EE600A	Independent Research (5), 1
2006	Spr	EE700A	Masters Thesis (10), 2; (7), 1
2006	Spr	EE800A	Doctoral Dissertation (10), 2

6.2 Supervision of Undergraduate Independent Study

Student Name	Project Title	Date
Jonathan Park	RPV Project	Winter 1993
Jonathan Park	Global Positioning System	Spring 1993
Todd Stedman	Interactions between hardware, software & biology	Autumn 1995
Curtis Anderson	Design & Control of Microtiter Plate Station	Winter 1996
Virginie Mouton	Visual C++ for the Genomation Laboratory (visiting student from France)	Summer 1996
Joel Reiter	Genome Automation (gel loading) (Mr. Reiter received a Mary Gates Fellowship for undergraduate research with me Winter/Spring 1997)	Summer 1996- Spring 1998
Alvaro Erickson	SIR-1 Robot Controller Interface & Software	Summer 1997
John Fortner	SIR-1 Servo Controller Boards & Integration	Summer 1997
Brett Osada	SIR-1 Robot Software Library Implementation	Autumn 1997 Winter 1998
Robert Smythe	SIR-1 Control Systems Design & Integration	Autumn 1997 Winter 1998
Mark Borden (ASU)	Surface Chemistry Experiments for Acapella	Summer 1998
Eric Dixon	Capillary Gel Loading	Summer 1998- Spring 1999
Vitaliy Mosesov	High-Throughput Experiments on Acapella Automated reagent reservoir for reagent dispensers Testing of Acapella-5K	Summer 1998 through Autumn 2000
Si Truong	Detector for Scanditronix System in Radiation Oncology	Winter 1999
Tod Kershaw	Linear Generator with Frequency Optimization Control System for Electric Cars	Winter 1999 Spring 1999
Mark Borden (ASU)	Purification Optimization & Bioreactor Design	Summer 1999

Yasmine Srouji (PSU)	Microfabrication Design	Summer 1999
Justin Snapp (Lakeside High School)	Experiments on Acapella 5K Piezoelectric Dispenser Diagnostics (to Stanford for graduate school)	Summer 1999 Summer 2000
Jay Yedinak	Automated Gel Loading	Winter 2000 Spring 2000
Seema Ghosh	Experiments on Real-time Quantitative Thermal Cycling	Winter 2001
Jeff Walters	Tests of Piezoelectric Sensors for Acapella-5K	Winter 2001
Tim Ren	Software Development for Real-Time Quantitative Thermal Cycling Software for Genomation Lab projects	Winter 2001- -Winter 2003
Matt Stanton	Microscale system for automating biopsy preparation (visiting from Princeton University)	Summer 2002
Michael Wang	Laser scanning confocal microscope with commercial environmental control (MLSC undergrad fellowship)	Summer 2002- Summer 2004
Andrew Miller	MEMS system for automating tissue sample biopsies (MLSC undergraduate fellowship; Mark Holl, supervisor) (NASA Space Grant Scholar)	Summer 2002- present
Kendan Jones-Isaac	Biochemistry for ACAPELLA-5K and MRD (BRIDGES minority student) (GenOM Outreach to Minorities Fellowship)	Summer 2002- Spring 2004
Kendan Jones-Isaac	Single cell macrophage experiments for the MLSC (GenOM Outreach to Minorities Fellowship) (NIH Research Fellow 2005-2006)	Autumn 2004- Summer 2005
Tracy Fung	Experiments on the laser scanning confocal microscope & adhesion of yeast using microprinting with con-A; Single cell experiments for the MLSC (MLSC undergraduate fellow)	Spring 2002- Spring 2005
Tracy Fung	SURP (Summer Undergraduate Research Program) Fellow NASA Space Grant	Summer 2005
Tracy Fung	Liquid crystal temperature sensor for microfluidic devices (to Stanford for {Ph.D.})	Autumn 2005- Spring 2006
Ellen Griffin	Electronics for the Genomation Lab Real-time quantitative PCR	Autumn 2003- Summer 2004 Spring 2005
Jen Phipps	Micromolding PDMS valves for Microsystems	Spring 2004
Neha Auluck	Acoustic Trapping of Particles and Cells & micromolding	Spring 2004- Summer 2005
Shile Zhang	Single cell macrophage experiments for the MLSC	Spring 2005-

		Winter 2006
James Wolfe	SURP (Summer Undergraduate Research Program) Fellow NASA Space Grant	Summer 2005
Kathryn Winglee	SURP (Summer Undergraduate Research Program) Fellow NASA Space Grant	Summer 2005
Kathryn Winglee	Microfluidic system for q-RT-PCR	Autumn 2005- Summer 2006
Jeffrey Houkal	Protein crystallography automation	Autumn 2005- Summer 2006
Brian Wolfe	Soft lithography for single cell analyses	Autumn 2005- Summer 2006

6.3 Other Teaching Experience and Development

Teaching Institute: Participated in the National Effective Teaching Institute of the ASEE, Edmonton, Alberta, June 23-25, 1994. I presented material from this course to the EE Faculty in 1995.

NSF ASEE Visiting Scholar: Organized and participated in the workshops by Professor Susan Ambrose, Professor of History and Director of the Eberly Center for Teaching Excellence at Carnegie Mellon University. The workshops on 1) Transforming a System: The Student and 2) Lecturing as a Framework for Interactive Teaching were held at UW March 3-4, 1998.

Provost's Third Annual Faculty Workshops on Teaching and Learning: Workshop on Uses of Technology in Teaching, University of Washington, September 9, 1998.

UW Center for Engineering Learning and Teaching (CELT) and College of Engineering (COE) sponsored NSF / ASEE Workshop on Teaching, University of Washington, October 23, 2000.

6.4 Any Other Supporting Documents on Teaching Development and Effectiveness

EE500R: I was one of the founders of the Robotics Colloquium in 1993 along with Blake Hannaford and Bob Albrecht. I initiated the UWTV aspect of this colloquium and the placement of video tapes in the Engineering Library.

EE/AA549 (System Identification and Estimation): Developed and incorporated laboratory aspect to this course in 1993-94. Students designed and implemented Kalman filters for the inverted pendulum experiment in the Control Systems Laboratory. According to their feedback, this laboratory exercise added greatly to students' understanding of the course material.

EE/AA448 (Control System Sensors and Actuators): **Winter 1997** -- Designed and implemented a new lab to design and implement a digital controller on a DSP board and close the loop with a vibration isolation experiment in the Controls Laboratory. **Winter 1998** -- I worked with undergraduates to set up three 6-degree-of-Freedom SIR-1 robots in the Controls Laboratory. For EE/AA448 we designed a new gripper with an integrated force sensor, developed servo controller boards and designed a new lab. This lab was piloted in Winter 1998. In **Winter 1999**, instituted a new Lab 6 which allowed each group to design and choose their own projects. One of these projects, a stepper motor controller design & implementation on Z-World, won 2nd place at the EE Industry Day, May 1999.

ENGR100: Autumn 1999 -- Dean Denton and Gretchen Kalonji initiated a new section of ENGR100 where teams of students at UW worked with teams of students at Tohoku University in Japan. I worked with a team of 3 UW students and collaborated with Prof. Nakayama and his team in Tohoku. We jointly designed a team project on thermal cycling of DNA products. The teams at UW and in Japan compared results and communicated via the web. Graduate student Neal Friedman and undergraduate Vitaliy Mosesov assisted with the course. **Autumn 2000** – led another team of 3 students to learn about piezoelectrics and build/test a piezoelectric sensor as a diagnostic tool for piezoelectric dispensers. We collaborated with Prof. Yasuo Cho in Japan. Undergraduate Vitaliy Mosesov and research engineer Aaron Torok assisted with the course.

Autumn 2003 – UW Freshman Orientation Seminar – Presented an orientation seminar for incoming freshman to the UW on September 26, 2003. I went over nuts and bolts, expectations, experiences, and questions.

EE546 Winter 2003 & EE400M/EE546B Winter 2004/2005/2006 – Professor Mary Lidstrom and I initiated this first graduate course on Biology and Genomics for Engineers. Professor Lidstrom teaches the first third of the course on DNA, genetics, mutation, polymerase chain reaction (PCR), and ethical, legal, and social issues (ELSI) based upon an undergraduate course she has taught. I developed a new second half on genetic diseases, systems approach to biology, regulatory circuits, and cells as batteries. The students also perform labs on PCR, DNA sequencing, and genetic engineering. The final projects are performed in teams on genomics problems and how to solve them from an engineering perspective. The course is taught in a problem-based learning format. The 20 students (size limited due to labs) in the class are mostly from EE but also from ChemE, ME, and Applied Math. Other faculty and students often audit the course.

7. Service

7.1 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.

7.2 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 & 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.

7.3 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 – June 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.

7.4 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 & Andy Crick) to Lakeridge Elementary 1st 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 3rd grade students, June 2004.

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

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

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

Adjunct Faculty, Horizon Community Learning Center, Phoenix, Arizona, January 2007 - present.

7.5 National Service

Speaker at Zonta International Regional Meeting, October 1997.

Policy committees

Member, National Human Genome Advisory Council, Department of Health and Human Services, May 2006 – December 2008.

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 Board

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 – present.