

Karl F. Böhringer Biographical Sketch

Professional Preparation

1990	University of Karlsruhe, Germany	Information Sciences	Dipl.-Inform.
1993	Cornell University	Computer Science	M.S.
1997	Cornell University	Computer Science	Ph.D.
1996 – 1998	University of California, Berkeley	MEMS, Microrobotics, Microassembly	Postdoc

Appointments

2003 – present	Associate Professor, Department of Electrical Engineering, University of Washington, Seattle Adjunct Associate Professor, Depts. Of Computer Science & Engineering and Mech. Engineering
1998 – 2003	Assistant Professor, Department of Electrical Engineering, University of Washington, Seattle Adjunct Assistant Professor, Depts. of Computer Science & Engineering and Mech. Engineering
August 2000	Visiting Professor, Electronic Systems Department, University of São Paulo, Brazil
1996 – 1998	Postdoctoral Researcher, Department of Industrial Engineering and Operations Research and Berkeley Sensor & Actuator Center, University of California, Berkeley
Autumn 1997	Lecturer, Dept. of Electrical Engineering & Computer Science, University of California, Berkeley
1994 – 1995	Visiting Scholar, Center for Integrated Systems / Robotics Laboratory, Stanford University

Awards and Honors

2003	Entry in the “Top 100 Science Stories”, <i>Discover</i> magazine’s special issue “Year in Science”
2000	NSF New Century Scholar
1999	NSF CAREER Award
1997	NSF CISE Postdoctoral Associateship
1997	Nominated for ACM Doctoral Dissertation Award
1994 – 1995	Nominated for Best Conference Papers: <ul style="list-style-type: none">• Micro- and Nano-Engineering (9/1995, Aix-en-Provence, France)• IEEE Int. Conf. On Robotics & Automation (1995, Nagoya, Japan)• IEEE Int. Conf. On Robotics & Automation (1994, San Diego, CA)

Publications

Selected publications related to proposed project

1. Karl F. Böhringer, “Optimal Strategies for Moving Droplets in Digital Microfluidic Systems.” To appear in *Seventh International Conference on Miniaturized Chemical and Biochemical Analysis Systems (Micro-TAS’03)*, Squaw Valley, CA, October 5-9, 2003.
2. Karl F. Böhringer, “Surface Modification and Modification in Microstructures: Controlling Protein Adsorption, Monolayer Desorption, and Micro-Self-Assembly.” To appear in *IOP Journal of Micromechanics and Microengineering (JMM)*, accepted March 2003, scheduled for publication July 2003.
3. Xiaorong Xiong, Yael Hanein, Jiandong Fang, Yanbing Wang, Weihua Wang, Daniel T. Schwartz, Karl F. Böhringer, “Controlled Multi-Batch Self-Assembly of Micro Devices.” *ASME/IEEE Journal of Microelectromechanical Systems* 12(2):117-127, April 2003.
4. K. F. Böhringer and H. Choset, editors, *Distributed Manipulation*, Kluwer Academic Publishers, 272 pp., ISBN 0-7923-7728-1, January 2000.
5. K. F. Böhringer, B. R. Donald, N. C. MacDonald, “Programmable Vector Fields for Distributed Manipulation, with Applications to MEMS Actuator Arrays and Vibratory Parts Feeders.” *Int. J. of Robotics Research* 18(2):168-200, February 1999.

Selected other publications

6. Y. Wang, X. Cheng, Y. Hanein, B. Ratner, K. F. Böhringer, “Protein Patterning with Programmable Surface Chemistry Chips.” *6th Int. Conf. on Miniaturized Chemical and Biochemical Analysis Systems (Micro TAS 2002)*, vol.1 pp. 482-484, Nara, Japan, November 3-7, 2002.
7. M. Terry, J. Reiter, K. F. Böhringer, J. W. Suh, G. T. A. Kovacs, “A Docking System for Microsatellites based on MEMS Actuator Arrays.” *Smart Materials and Structures* 10(6):1176-1184, December 2001.

8. Y. Hanein, Y. V. Pan, B. D. Ratner, D. D. Denton, K. F. Böhringer, "Micromachining of Non-fouling Coatings for Bio-MEMS Applications." *Sensors & Actuators B: Chemical* 81(1):49-54, Dec. 15, 2001.
9. A. Hatch, A. E. Kamholz, G. Holman, P. Yager, K. F. Böhringer, "A Ferrofluidic Magnetic Micropump." *J. of Microelectromechanical Systems* 10(2):215-221, June 2001.
10. J. W. Suh, R. B. Darling, K. F. Böhringer, B. R. Donald, H. Baltes, G. T. A. Kovacs, "CMOS Integrated Organic Ciliary Array as a General-Purpose Micromanipulation Tool for Small Objects." *ASME/IEEE J. of Microelectromechanical Systems* 8(4):483-496, December 1999.

Synergistic Activities

- Service to Scientific Community: The PI's dissertation work on *Programmable Force Fields for Distributed Manipulation, and Their Implementation Using Microfabricated Actuator Arrays* has made a major contribution towards creating a new research field at the border of MEMS and robotics. The PI has co-organized a workshop on *Distributed Manipulation* at the 1999 IEEE Int. Conf. on Robotics and Automation, and he has co-edited a book on *Distributed Manipulation* [4].
- Minority Outreach: Every summer since the start of his appointment at the University of Washington, the PI has participated in the ALVA program (Alliance for Learning and Vision for Underrepresented Americans). Incoming freshmen from underrepresented minorities receive a head start in university life with an intense, 8-week work/study program including 2 hours of daily math classes and 6 hours of research laboratory activity. One freshman per summer was mentored in the PI's lab since summer 1999.
- Freshmen Interest Groups (FIG's) and Undergraduate Research: a FIG is a small group of freshmen with similar class schedules and study interests. FIG's are organized by the UW College of Engineering with the intention to create a better work and social environment for incoming students. Every autumn since 2000, the PI has helped in mentoring one FIG, and he has supervised a FIG research project in his lab.
- Interdisciplinary Activities: The PI is a member of the UW Center for Nanotechnology. The nanotechnology Ph.D. option requires a quarter-long laboratory rotation for every participating student. So far, the PI has hosted one nanotechnology lab rotation for a chemical engineering student interested in microreactors and MEMS fuel cells, and participates in the UW Nanotechnology student mentoring program.
- Art and Technology: The PI has created a one-millionth scale silicon replica of Frank Lloyd Wright's building *Fallingwater*, exploring the influence of technology on our perception of distance, scale, and structure. This piece was shown in art galleries in San Francisco and Boston, and featured in *I.D. Magazine*, *New York Times Magazine*, *Wired*, *Ylem*, and others. Joint work with K. Goldberg, UC Berkeley.

Collaborators and Other Affiliations

Collaborators within past 48 months: Henry Baltes (ETH Zürich), Mark Campbell (UW), Howie Choset (Carnegie Mellon), Michael Cohn (Microassembly Technologies, Inc), Tom Daniel (UW), Bruce Darling (UW), Denice Denton (UW), Chris Diorio (UW), Bruce Donald (Cornell / Dartmouth), Ron Fearing (UC Berkeley), Fred Forster (UW), Ken Goldberg (UC Berkeley), Andreas Greiner (University of Freiburg, Germany), Dan Halperin (Stanford / Tel Aviv), Yael Hanein (UW), Roger Howe (UC Berkeley), Shaoyi Jiang (UW), Lydia Kavraki (Rice), Jan Korvink (University of Freiburg, Germany), Greg Kovacs (Stanford), Noel MacDonald (Cornell / UCSB), Mark Overmars (Utrecht), Al Pisano (UC Berkeley), Buddy Ratner (UW), Daniel Schwartz (UW), John Suh (Xerox PARC), Juris Vagners (UW), Viola Vogel (UW), Bernhard Weigl (Micronics, Inc.), Dennis Willows (UW), Paul Yager (UW).

Graduate and Postdoctoral Advisors:

Graduate advisor (M.S., Ph.D.): Bruce R. Donald, Department of Computer Science, Cornell University (now at Department of Computer Science, Dartmouth College).

Postdoctoral advisor: Kenneth Y. Goldberg, Department of Industrial Engineering and Operations Research and Department of Computer Science, University of California, Berkeley.

Thesis Advisor and Postgraduate-Scholar Sponsor (15 total, all University of Washington):

Postdoc (3): Yael Hanein (NSF CISE Postdoc Associateship 1999), Christian Schabmüller, Ashutosh Shastry*.

Ph.D. (6): Xiaorong Xiong* (Ford Fellowship 2001), Kerwin Wang*, Yanbing Wang*, Jiandong Fang*, Sheng-Hsiung Liang*, Anupama Govindarajan*.

M.S. (6): Liang Hong, Joel Reiter (Boeing Engineering Fellowship 1999), Mason Terry (NSF Graduate Fellowship 2000), Robert MacDonald, Matthew Clements* (National Defense Science and Engineering Graduate Fellowship 2001), Sidhartha Goyal*.

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