

Robson Forensic

Engineers, Architects, Scientists & Fire Investigators

LARRY FENNIGKOH, Ph.D., P.E. Biomedical Engineer

PROFESSIONAL EXPERIENCE

2007 to **Robson Forensic, Inc.**

present *Associate*

Provide technical investigations, analysis, reports, and testimony towards the resolution of commercial and personal injury litigation involving medical devices, systems, and consumable products from engineering, clinical, and economic perspectives and failure analysis.

1998 to **Milwaukee School of Engineering, Milwaukee, WI**

present *Faculty member, Electrical Engineering & Computer Science Department*

Teach undergraduate and graduate courses in medical instrumentation, biomedical engineering design, biomechanics, biostatistics, and physiology. Institutional Review Board member. Advisor within NSF-funded program for undergraduate research. Adjunct teaching appointment since 1983.

Summer **Medical College of Wisconsin**

2006 to *Professor, Department of Physiology*

present Teaches a summer course on Biostatistics and the Design of Experiments to the department's Ph.D. students.

Spring **Marquette University**

2005 *Professor, Biomedical Engineering Department*

Taught a one semester senior / graduate level course in Biomedical Instrumentation Design

1999 to **School of Allied Health Professions, University of Wisconsin, Milwaukee, WI**

present *Adjunct Clinical Associate Professor*

Collaborative role with faculty and students enrolled in Human Movement Sciences Department; M.S. thesis committee, faculty search & screen committee.

1982 to **St. Luke's Medical Center, Milwaukee, WI**

1997 *Director of Clinical Engineering*

Responsible for directing and managing a 54-person technical support department. Oversaw the maintenance, installation, and management of virtually all: diagnostic, therapeutic, and imaging technologies; non-clinical equipment and systems; telecommunications, computer equipment, and network infrastructure. Further involved in the testing, evaluation, and selection of new equipment; investigation of equipment-related incidents; equipment modifications; service contract management; and biomedical engineering student internship programs.

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1978 to **University of Nebraska Medical Center**

1982 *Director, Biomedical Instrumentation*

Directed and managed a technical staff of 18 responsible for clinical and non-clinical equipment repair and maintenance, product evaluation, and extensive support of biomedical research.

Other full and part-time positions between 1974 and 1978 have included:

University of Nebraska, College of Engineering & Technology, *Adjunct Instructor*

Lakeland Hospital, - Elkhorn, WI, *Head, Clinical Engineering*

EDUCATION

Doctor of Philosophy - Industrial Engineering (human factors & biomechanics),
University of Wisconsin – Milwaukee, 1995
Dissertation: "Mediating Effects of Wrist Reaction Torque on Grip Force Production"

M.S., Engineering Management, Milwaukee School of Engineering, 1986.
B.S., Electrical Engineering Technology, Milwaukee School of Engineering, 1974.
A.A.S., Electronic Communications, Milwaukee School of Engineering, 1974.

Continuing Education:

American Academy of Forensic Sciences, San Antonio, TX, 2007
Association for the Advancement of Medical Instrumentation, 2002, 2005, 2006.
Great Lakes Biomedical Conference, Racine, WI, 1999-2007
Biomedical Associations of Wisconsin, Milwaukee, WI, 2004
Integrating Design in the Engineering Curriculum, Dallas, TX, 2003.
Medical Device Design, Minneapolis, MN, 2003
National Center for Medical Rehabilitation Research, Rockville, MD, 2001
Research to Aid Persons with Disabilities, Washington, DC, 2001
American Society for Engineering Education, St. Louis, MO, 2000
American Society of Biomechanics, Pittsburgh, PA, 1999
Advanced Ergonomic Workshop, 1995
Telecommunications Management Planning
Structured Building Wiring Systems
The Engineering Expert and the Courts
Advanced Radiation Physics
Advanced Medical/Surgical Nursing
Annual meetings of IEEE Engineering in Medicine & Biology Society, 1982-1995
Annual meetings of the American Society for Hospital Engineering, 1982-1995

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PROFESSIONAL MEMBERSHIPS

Institute of Electrical & Electronic Engineers, Member
Engineering in Medicine & Biology Society, Member
National Chairman, 1982-1987
IEEE Milwaukee Section, Director, 1987-1990
Milwaukee Section IEEE EMBS, Chairman, 1985-1986
American Society for Engineering Education, Member
Association for the Advancement of Medical Instrumentation, Member
Editorial Board Member, *Biomedical Instrumentation & Technology*
Accreditation Board of Engineering & Technology, Evaluator, 1988-1991
Clinical Engineering Board of Examiners, Intl. Certification Commission, Member,
1989-1992
American College of Clinical Engineering, Treasurer & Founding Member, 1990-
1992

FUNDED RESEARCH

Physics and biomechanics of golf putting. June 2006-present.
National Science Foundation, No. 81028, Co-principal investigator, "Undergraduate Design Projects to Aid Persons with Disabilities." 1999-2001.

PATENT

No. 4,457,312: "Method and Apparatus for Providing Records of Events during a Cardiac Arrest." J.P. Ornato, L. Fennigkoh, C. Jaeger.

AWARDS

American College of Clinical Engineering Patient Safety Advocacy Award, June 2006
UWM Outstanding Alumni Award, March, 2003
AAMI Clinical Engineering Achievement Award, May, 1994
MSOE Outstanding Alumni Award, October, 1989
Washington Park High School Hall of Fame, June, 1985

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Biomedical Engineer

PUBLICATIONS, ABSTRACTS, and PRESENTATIONS

Fennigkoh, L. (2005). Human Factors and the Control of Medical Error. Biomedical Instrumentation & Technology, July-August.

Hietpas, M.J., Bobby, J., Kress, D., Fennigkoh, L., et al. (in review). Determining the Influence of X-Coating on Platelet Function and Clinical Outcomes: A Randomized Prospective Trial. Perfusion.

Fennigkoh, L. (2004). Cost-effectiveness and Productivity, in Clinical Engineering Handbook. Academic Press, Joseph Dyro, ed.

L.A. Mrotek, B.A. Hart, P. Schot, L. Fennigkoh. (2004) Grip responses to object load perturbations are stimulus and phase sensitive. Experimental Brain Research, 155:413-420

Brown, S.M., Fennigkoh, L., Gerrits, R., et al. (2003). A Model of Venous Return While Utilizing Vacuum Assist During Cardiopulmonary Bypass. J. of Extracorporeal Technology, 35(3), 224-229

L.A. Mrotek, B.A. Hart, P. Schot, L. Fennigkoh. (2001). Grip Force Response to Object Load Changes during a Precision Grip Lift Task. Society of Neuroscience Annual Conference.

Fennigkoh, L., Garg, A, Hart, B. (1999). Mediating Effects of Wrist Reaction Torque on Grip Force Production. International Journal of Industrial Ergonomics, 23, 293-306.

Fennigkoh, L. (1994). Maintenance Predictors Available from an Equipment Classification System. Annual Meeting of the Association for the Advancement of Medical Instrumentation, Washington, DC

Nardizzi, A., Fennigkoh, L. (1992). The Biomedical Engineer's Role in Selecting Medical Technology from a Cost-of-Ownership Perspective. Annual Meeting of the Association for the Advancement of Medical Instrumentation, Los Angeles, CA

Fennigkoh, L. (1992). Medical Equipment Replacement Model. Journal of Clinical Engineering, February.

Fennigkoh, L. (1991). Management Courses for Clinical Engineering Curricula. Annual Meeting of the IEEE Engineering in Medicine & Biology, Orlando, FL

Fennigkoh, L. (1991). Human Factors and the Control of Operator Error. Annual Meeting of the Colorado Biomedical Association, Colorado Springs, CO, (invited paper).

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Fennigkoh, L. (1991). Training Medical Device Users. Pan American Health Organization Workshop, Washington, DC

Fennigkoh, L. (1990). A Medical Equipment Inventory Classification System. International Clinical Engineering Workshop; Weimar, East Germany, (invited paper).

Fennigkoh, L., Reimer, D., Traner, M. (1990). Characteristics & Performance Lithotripter Electrodes. Journal of Clinical Engineering, 15 (1).

Fennigkoh, L. (1990). Clinical Engineering and the Management of Operator Error. ASHE TECHNICAL DOCUMENT SERIES, April.

Fennigkoh, L., Smith, B.J. (1989). Clinical Equipment Management. JCAHO Plant, Technology, and Safety Management Series, No. 2, (Reprinted, 1997).

Fennigkoh, L. (1988). A Survey of Persons Certified in Clinical Engineering and Their Thoughts on the Profession. Medical Instrumentation, 22(4).

Fennigkoh, L. (1988). A Profile of Certified Clinical Engineers. World Congress on Medical Physics & Biomedical Engineering, San Antonio, TX

Fennigkoh, L. (1987). Monitoring Employee Performance. Pennsylvania Hospital Association, Hershey, PA,

Fennigkoh, L. (1987). The Use of Spreadsheets & Graphics in Clinical Engineering Management. 3rd ASHE Clinical Engineering Symposium, Denver, CO

Fennigkoh, L. (1987). The BMET in Transition to Management. Proceedings of the Annual Meeting, American Society for Hospital Engineering, San Diego, CA

Fennigkoh, L. (1987). Management of the Clinical Engineering Department: How to Convert a 'Cost Center' into a 'Profit Center.' Quest Publishing Co., Brea, CA

Fennigkoh, L. (1986). Clinical Engineering Performance Measures. IEEE Engineering in Medicine & Biology Conference, Fort Worth, TX

Fennigkoh, L. (1986). Medical Equipment Maintenance Performance Measures. ASHE Technical Document Series, No. 055880.

Fennigkoh, L. (1986). Clinical Engineering Support of an Artificial Heart Program. 2nd Annual ASHE Clinical Engineering Symposium, Baltimore, MD

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Gonnering, R.S., Fennigkoh, L. (1985). Decreased Muscle Sounds after treatment with Botulinum-A Toxin, in Blepharospasm and related disorders: A Historical Review of Etiology and Treatment, Advances in Ophthalmic Plastic and Reconstructive Surgery, 4. Pergamon, Press Ltd.

Fennigkoh, L. (1985). Factors Influencing BMET Job Performance. 7th Annual Conference, Frontiers of Engineering & Computing in Health Care, Chicago, IL

Fennigkoh, L. (1985). Financial Considerations for a Magnetic Resonance Imaging Facility. IEEE EMBS Magazine, September.

Fennigkoh, L. (1985). Controlling Medical Equipment Maintenance Costs. 20th Annual Meeting - Association for the Advancement of Medical Instrumentation, Boston, MA (invited paper).

Fennigkoh, L. (1984). Monitoring Medical Equipment Maintenance Costs. 6th Annual Conference. Frontiers of Engineering and Computing in Health Care, Los Angeles, CA

Fennigkoh, L. (1984). The Clinical Engineering Health Care Mismatch: Its Effect on Personnel Management. Medical & Biological Engineering & Computing. (Journal of the International Federation of Medical & Biological Engineering), (invited paper).

Fennigkoh, L. (1982). Essential Elements of an Effective Equipment Control Program. Annual Meeting-American Society for Hospital Engineering, New York, NY.

Fennigkoh, L. (1982). Managing Career Induced Stress. 17th Annual Meeting Association for the Advancement of Medical Instrumentation, San Francisco, CA (invited paper).

Fennigkoh, L. (1981). The Burned-Out Clinical Engineer. Medical Instrumentation, 15(6), (invited paper).

Fennigkoh, L. (1981). Clinical Engineering Burnout. 16th Annual Meeting Association for the Advancement of Medical Instrumentation, Washington, DC (invited paper).

Fennigkoh, L. (1981). Simple Technique for Determining a Recorder's Lower 3dB Point. Medical Instrumentation, 14(3).

Ornato, J.P., Fennigkoh, L., et al. (1981). The Electronic Clipboard: An Automated System for Accurately Recording Events During a Cardiac Arrest. Annals of Emergency Medicine, 10(3).

Fennigkoh, L. (1974). Binocular Fixation Feedback in the Reeducation of Oculomotor Imbalance. 29th Annual Conference on Engineering in Medicine & Biology, Philadelphia, PA

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Chaired or committee member on the following Master of Science theses:

“An In-vitro study on the use of an arterial bubble trap incorporated into the venous lines,” Julie Knechtsberger, June 2006.

“Design of a Leak Detection System for Automated Animal Watering using Neural Networks,” Robert Dellemann, May 2006.

“Comparative Analysis of Human and Bovine Hematology with Respect to Experimental and Clinical Cardiopulmonary Bypass: A Literature Review,” Dan Costantini, June 2005.

“The Validity of Utilizing Swine Blood in Cardiopulmonary Models: A Literature Review,” Han-sen Sun, July 2005.

“The Clinical Impact of Leukodepletion during Cardiopulmonary Bypass: A Systematic Review and Metaanalysis of Clinical Trials, Amber Blakey, July 2005.

“The Effect of Negative Pressures used during Ultrafiltration on Erythrocytes,” Kathleen Dryden, September 2004.

“Effects of Viscosity on Cardioplegia Blood Flow as determined by a mathematical model incorporating elastic coronary arteries,” Damien Cook, May 2004.

“A mathematical model of the effects of hemoconcentration on renal function,” Trisha Casey, August 2004.

“The effect of patient variables on the rewarming rate during cardiopulmonary bypass,” Aaron Baternik, August 2004.

“The effects of shear stress on neutrophil activation,” Todd Rogers, May 2004.

“A study to determine the adsorption potential of a hydroxyapatite preparation for removal of heparin from circulating blood,” David Hurd, November 2003.

“A preliminary investigation into the occurrence of cavitation in the cardiopulmonary bypass circuit,” Cameron Bryan, 2003.

“Effect of depolarizing versus non-depolarizing preservation solution on the percentage of myocardial water content in isolated rat hearts,” Michelle Garofali, 2003.

“The effects of high shear stress on platelet function,” Trisha McNair, May 2003.

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“Determination of the effects of two intra-operative blood conservation techniques on systematic inflammatory response when augmented by leukocyte filtration,” Matthew War Hoover, 2002.

“A Comparative study of adult arterial line filters,” Matthew Tittl, February 2002.

“The determination of the effects of intra-operative hemoconcentration on renal function,” Jennifer Schmidt, July 2001.

“A model of venous return while utilizing vacuum assist during cardiopulmonary bypass,” Scott Brown, May 2000.

Short Course on Medical Instrumentation and Physiology – developed and taught a four ½-day course for biomedical engineers and technicians. This course is currently being offered each August.

EXPERT NOT RETAINED