



Hand Research Laboratory

<http://www.pitt.edu/~zml/handlab/>

Zong-Ming Li, PhD



From Left: Goitz, Christophel, James, Tang, Li, Chauhan, Chen

Our Hand Research Laboratory is dedicated to the scientific study of the human hand. Our research team encompasses a wide spectrum of expertise in engineering, kinesiology, biomechanics, motor control, orthopaedics, occupational therapy, biology, and neurology. We have cutting-edge engineering equipment and clinical facilities for hand research. Our research activities include basic science studies of the hand and clinical applications, such as carpal tunnel syndrome.

Zong-Ming Li, PhD, Assistant Professor in the Departments of Orthopaedic Surgery, Bioengineering, and Occupational Therapy provides the overall leadership of the Hand Research Laboratory. Robert J. Goitz, MD and Robert A. Kaufmann, MD, our attending hand surgeons, continue to provide clinical support to our research program. Nancy A. Baker, ScD, OTR/L, and Norm Gustafson, CHT, both faculty in Occupational Therapy remain to lend a rehabilitation perspective to our projects. Ms. Erica Guo, a graduate student at Sichuan University, China, continues her thesis work on carpal tunnel modeling under the guidance of Dr. Yubo Fan and Dr. Zong-Ming Li. Ms. Teresa Brininger, a graduate student in Occupational Therapy, progresses with her clinical studies of improving carpal tunnel syndrome with various conservative treatments. Mr. Thomas Christophel, while being busy with his dual BS degrees in Bioengineering and Computer Engineering, continues to offer us technical assistance.

We bided farewell to several members who have made significant contributions to our Hand Research Laboratory. Michael Espiritu, MD, returned to orthopaedic residency after one year of research in our laboratory. After completing their research fellowships, Shouchen Dun, MS, Chris Ugbohue, PhD, and Gregg Davis, MS, advanced in their new careers. Laurel Kuxhaus, MS, moved to another laboratory for her graduate studies. We wish them great success in their career pursuits.

In the past year, we have been very happy to welcome several talented members to our Hand Lab. Ms. Jie Tang joined us as a Research Associate after earning her Master's degree in Biomedical Engineering from Case Western Reserve University. Jie also has a Master's degree from Tsinghua University in China. Three medical students recently joined our Hand Lab. Mr. Eric James is enthusiastically studying thumb biomechanics using the motion and EMG systems. Mr. Chirag Chauhan devotes himself to the investigation of carpal tunnel mechanics. Mr. Jerry Chen is eager to explore the molecular mechanisms of carpal tunnel syndrome.

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Finally, Ms. Jessica Wallace, an undergraduate student, enjoys organizing laboratory and office functions in our Hand Lab.

Our laboratory is proud to collaborate with several outstanding researchers. Dr. James Wang has been providing his expertise in mechanobiology for the study of molecular mechanisms of carpal tunnel syndrome. Dr. Xudong Zhang at University of Illinois at Urbana Champaign works together with our laboratory on a study about finger motion synergies and system dynamics. Dr. Grace Szeto at Hong Kong Polytechnic University, teams up with us on a study of typing control. Dr. Yongping Zheng at Hong Kong Polytechnic University collaborates with us on carpal tunnel syndrome research using his tissue ultrasound palpation system.

In the past year, our research has been financially supported by the Whitaker Foundation, the Aircast Foundation, The Pittsburgh Foundation, University of Pittsburgh Hewlett International Grant Program, and our own Department of Orthopaedic Surgery. Meanwhile, our laboratory submitted our revised grant proposal to the National Institutes of Health on the study of carpal tunnel syndrome. We also submitted a grant proposal to The Whitaker Foundation for transitional fund. Dr. Xudong Zhang and Dr. Zong-Ming Li submitted an exploratory grant proposal to the National Institute for Occupational Safety and Health for a study of the normal and pathological hands using experimental and modeling approaches. Dr. Grace Szeto, with collaboration with our laboratory, led a grant proposal to The Hong Kong Polytechnic University Research Committee for a study of keyboard operation in carpal tunnel syndrome patients. We believe our research effort will increase our understanding of the underlying mechanisms of carpal tunnel syndrome and provide new strategies for its prevention, diagnosis, evaluation, and treatment.

Our Hand Research Laboratory actively disseminated our research results in national and international conferences in the past year. We presented five papers at the Annual Meeting for American Society of Biomechanics in Portland, Oregon. We gave three presentations at the 5th Triennial International Hand and Wrist Biomechanics Symposium in Syracuse, New York. Dr. Zong-Ming Li was invited to give a kernel talk on the bioengineering studies of carpal tunnel syndrome at The Second World Congress for Chinese Biomedical Engineers in Beijing, China. Most recently, our laboratory presented our study on carpal tunnel mechanics at the International Symposium on Ligaments and Tendons; we also presented two papers at the 51st Orthopaedic Research Society meeting, one topic on finger joint stiffness and the other on carpal tunnel morphometry.

Our Hand Research Laboratory has been undergoing tremendous development in the past few years. We are proud of our accomplishments in hand research, and look forward to another fruitful year.

Laboratory Personnel

Nancy Baker, DSc, OTR/L	Faculty in Occupational Therapy
Teresa Brininger, OTR/L, CHT	Graduate Student
Chirag Chauhan, BS	Medical Student
Jerry Chen, BS	Medical Student
Thomas Christophel	Undergraduate Student
Robert Goitz, MD	Faculty in Orthopaedic Surgery
Norm Gustafson, OTR/L, CHT	Faculty in Occupational Therapy
Eric James, BS	Medical Student
Robert Kaufmann, MD	Faculty in Orthopaedic Surgery
Zong-Ming Li, PhD	Director
Jie Tang, MS	Research Associate
Jessica Wallace	Undergraduate Student