

Stanford



David Camarillo

Assistant Professor of Bioengineering and, by courtesy, of Neurosurgery and of Mechanical Engineering

Bio

BIO

David B. Camarillo is Assistant Professor of Bioengineering, (by courtesy) Mechanical Engineering and Neurosurgery at Stanford University. Dr. Camarillo holds a B.S.E in Mechanical and Aerospace Engineering from Princeton University, a Ph.D. in Mechanical Engineering from Stanford University and completed postdoctoral fellowships in Biophysics at the UCSF and Biodesign Innovation at Stanford. Dr. Camarillo worked in the surgical robotics industry at Intuitive Surgical and Hansen Medical, before launching his laboratory at Stanford in 2012. His current research focuses on precision human measurement for multiple clinical and physiological areas including the brain, heart, lungs, and reproductive system. Dr. Camarillo has been awarded the Hellman Fellowship, the Office of Naval Research Young Investigator Program award, among other honors including multiple best paper awards in brain injury and robotic surgery. His research has been funded by the NIH, NSF, DoD, as well as corporations and private philanthropy. His lab's research has been featured on NPR, the New York Times, The Washington Post, Science News, ESPN, and TED.com as well as other media outlets aimed at education of the public.

ACADEMIC APPOINTMENTS

- Assistant Professor, Bioengineering
- Assistant Professor (By courtesy), Mechanical Engineering
- Member, Bio-X
- Member, Maternal & Child Health Research Institute (MCHRI)
- Member, Wu Tsai Neurosciences Institute

BOARDS, ADVISORY COMMITTEES, PROFESSIONAL ORGANIZATIONS

- Member, Program in Biodesign (2012 - present)
- Member, Biomedical Engineering Society (BMES) (2014 - present)
- Member, National Neurotrauma Society (NNS) (2014 - present)
- Member, American Society of Mechanical Engineers (ASME) (2012 - present)
- Member, Institute of Electrical and Electronics Engineers (IEEE) (2005 - present)

PROFESSIONAL EDUCATION

- PhD, Stanford University , Mechanical Engineering (2008)
- BSE, Princeton , Mechanical and Aerospace Engineering (2001)

LINKS

- CamLab Website: <http://camlab.stanford.edu/>

Research & Scholarship

CLINICAL TRIALS

- Correlation Between Oocyte and Embryo Mechanical Properties on Embryo Development and Clinical Pregnancy After In Vitro Fertilization, Recruiting

Teaching

COURSES

2018-19

- Senior Capstone Design I: BIOE 141A (Aut)

2017-18

- Senior Capstone Design I: BIOE 141A (Aut)
- Senior Capstone Design II: BIOE 141B (Win)

2016-17

- Senior Capstone Design I: BIOE 141A (Aut)
- Senior Capstone Design II: BIOE 141B (Win)

STANFORD ADVISEES

Doctoral Dissertation Reader (AC)

Johanna O'Day, Cara Welker

Postdoctoral Faculty Sponsor

August Domel, Yuzhe Liu, Hossein Vahid Alizadeh, Majid (Seyed Abdolmajid) Yousefsani

Orals Evaluator

Marianne Black

Doctoral Dissertation Advisor (AC)

Michael Fanton

Master's Program Advisor

Carly Weber-Levine

Doctoral (Program)

Suhaas Anbazhakan, Ingrid Lan, James Thomson

Publications

PUBLICATIONS

- **Head Impact Kinematics Estimation With Network of Inertial Measurement Units.** *Journal of biomechanical engineering*
Kuo, C., Sganga, J., Fanton, M., Camarillo, D. B.
2018; 140 (9)
- **Comparison of video-based and sensor-based head impact exposure** *PLOS ONE*
Kuo, C., Wu, L., Loza, J., Senif, D., Anderson, S. C., Camarillo, D. B.
2018; 13 (6)
- **Spinal constraint modulates head instantaneous center of rotation and dictates head angular motion.** *Journal of biomechanics*
Kuo, C., Fanton, M., Wu, L., Camarillo, D.

2018

- **Voluntary Head Rotational Velocity and Implications for Brain Injury Risk Metrics.** *Journal of neurotrauma*
Hernandez, F., Camarillo, D. B.
2018
- **Validation of a Custom Instrumented Retainer Form Factor for Measuring Linear and Angular Head Impact Kinematics** *JOURNAL OF BIOMECHANICAL ENGINEERING-TRANSACTIONS OF THE ASME*
Miller, L. E., Kuo, C., Wu, L. C., Urban, J. E., Camarillo, D. B., Stitzel, J. D.
2018; 140 (5)
- **Mechanistic Insights into Human Brain Impact Dynamics through Modal Analysis** *PHYSICAL REVIEW LETTERS*
Laksari, K., Kurt, M., Babae, H., Kleiven, S., Camarillo, D.
2018; 120 (13): 138101
- **Propagation of errors from skull kinematic measurements to finite element tissue responses** *BIOMECHANICS AND MODELING IN MECHANOBIOLOGY*
Kuo, C., Wu, L., Zhao, W., Fanton, M., Ji, S., Camarillo, D. B.
2018; 17 (1): 235–47
- **Comparison of video-based and sensor-based head impact exposure.** *PloS one*
Kuo, C., Wu, L., Loza, J., Senif, D., Anderson, S. C., Camarillo, D. B.
2018; 13 (6): e0199238
- **Detection of American Football Head Impacts Using Biomechanical Features and Support Vector Machine Classification.** *Scientific reports*
Wu, L. C., Kuo, C., Loza, J., Kurt, M., Laksari, K., Yanez, L. Z., Senif, D., Anderson, S. C., Miller, L. E., Urban, J. E., Stitzel, J. D., Camarillo, D. B.
2017; 8 (1): 855
- **Pilot Findings of Brain Displacements and Deformations during Roller Coaster Rides** *JOURNAL OF NEUROTRAUMA*
Kuo, C., Wu, L. C., Ye, P. P., Laksari, K., Camarillo, D. B., Kuhl, E.
2017; 34 (22): 3198–3205
- **Performance Evaluation of a Pre-computed Brain Response Atlas in Dummy Head Impacts** *ANNALS OF BIOMEDICAL ENGINEERING*
Zhao, W., Kuo, C., Wu, L., Camarillo, D. B., Ji, S.
2017; 45 (10): 2437–50
- **Modeling and Optimization of Airbag Helmets for Preventing Head Injuries in Bicycling** *ANNALS OF BIOMEDICAL ENGINEERING*
Kurt, M., Laksari, K., Kuo, C., Grant, G. A., Camarillo, D. B.
2017; 45 (4): 1148-1160
- **Microfluidic analysis of oocyte and embryo biomechanical properties to improve outcomes in assisted reproductive technologies** *MOLECULAR HUMAN REPRODUCTION*
Yanez, L. Z., Camarillo, D. B.
2017; 23 (4): 235-247
- **Microfluidic analysis of oocyte and embryo biomechanical properties to improve outcomes in assisted reproductive technologies.** *Molecular human reproduction*
Yanez, L. Z., Camarillo, D. B.
2016: -?
- **Modeling and Optimization of Airbag Helmets for Preventing Head Injuries in Bicycling.** *Annals of biomedical engineering*
Kurt, M., Laksari, K., Kuo, C., Grant, G. A., Camarillo, D. B.
2016: -?
- **Bandwidth and sample rate requirements for wearable head impact sensors** *JOURNAL OF BIOMECHANICS*
Wu, L. C., Laksari, K., Kuo, C., Luck, J. F., Kleiven, S., Bass, C. R., Camarillo, D. B.
2016; 49 (13): 2918-2924
- **Effect of the mandible on mouthguard measurements of head kinematics** *JOURNAL OF BIOMECHANICS*
Kuo, C., Wu, L. C., Hammor, B. T., Luck, J. F., Cutcliffe, H. C., Lynall, R. C., Kait, J. R., Campbell, K. R., Mihalik, J. P., Bass, C. R., Camarillo, D. B.
2016; 49 (9): 1845-1853

- **In Vivo Evaluation of Wearable Head Impact Sensors** *ANNALS OF BIOMEDICAL ENGINEERING*
Wu, L. C., Nangia, V., Bui, K., Hammor, B., Kurt, M., Hernandez, F., Kuo, C., Camarillo, D. B.
2016; 44 (4): 1234-1245
- **Human oocyte developmental potential is predicted by mechanical properties within hours after fertilization.** *Nature communications*
Yanez, L. Z., Han, J., Behr, B. B., Reijo Pera, R. A., Camarillo, D. B.
2016; 7: 10809-?
- **Human oocyte developmental potential is predicted by mechanical properties within hours after fertilization.** *Nature communications*
Yanez, L. Z., Han, J., Behr, B. B., Pera, R. A., Camarillo, D. B.
2016; 7: 10809-?
- **Evaluation of a laboratory model of human head impact biomechanics.** *Journal of biomechanics*
Hernandez, F., Shull, P. B., Camarillo, D. B.
2015; 48 (12): 3469-3477
- **Six Degree-of-Freedom Measurements of Human Mild Traumatic Brain Injury** *ANNALS OF BIOMEDICAL ENGINEERING*
Hernandez, F., Wu, L. C., Yip, M. C., Laksari, K., Hoffman, A. R., Lopez, J. R., Grant, G. A., Kleiven, S., Camarillo, D. B.
2015; 43 (8): 1918-1934
- **Resonance of human brain under head acceleration.** *Journal of the Royal Society, Interface / the Royal Society*
Laksari, K., Wu, L. C., Kurt, M., Kuo, C., Camarillo, D. C.
2015; 12 (108)
- **Resonance of human brain under head acceleration.** *Journal of the Royal Society, Interface / the Royal Society*
Laksari, K., Wu, L. C., Kurt, M., Kuo, C., Camarillo, D. C.
2015; 12 (108)
- **A Head Impact Detection System Using SVM Classification and Proximity Sensing in an Instrumented Mouthguard** *IEEE TRANSACTIONS ON BIOMEDICAL ENGINEERING*
Wu, L. C., Zarnescu, L., Nangia, V., Cam, B., Camarillo, D. B.
2014; 61 (11): 2659-2668
- **Model-Less Feedback Control of Continuum Manipulators in Constrained Environments** *IEEE TRANSACTIONS ON ROBOTICS*
Yip, M. C., Camarillo, D. B.
2014; 30 (4): 880-889
- **Multicellular architecture of malignant breast epithelia influences mechanics.** *PloS one*
Venugopalan, G., Camarillo, D. B., Webster, K. D., Reber, C. D., Sethian, J. A., Weaver, V. M., Fletcher, D. A., El-Samad, H., Rycroft, C. H.
2014; 9 (8)
- **A Head Impact Detection System Using SVM Classification and Proximity Sensing in an Instrumented Mouthguard.** *IEEE transactions on bio-medical engineering*
Wu, L., Zarnescu, L., Nangia, V., Cam, B., Camarillo, D.
2014
- **Model-less Feedback Control of Continuum Manipulators in Constrained Environments** *IEEE Transactions on Robotics*
Yip, M. C., Camarillo, D. B.
2014; 30 (4): 880-889
- **Outcomes from a Postgraduate Biomedical Technology Innovation Training Program: The First 12 Years of Stanford Biodesign** *ANNALS OF BIOMEDICAL ENGINEERING*
Brinton, T. J., Kurihara, C. Q., Camarillo, D. B., Pietzsch, J. B., Gorodsky, J., Zenios, S. A., Doshi, R., Shen, C., Kumar, U. N., Mairal, A., Watkins, J., Popp, R. L., Wang, et al
2013; 41 (9): 1803-1810
- **An Instrumented Mouthguard for Measuring Linear and Angular Head Impact Kinematics in American Football** *ANNALS OF BIOMEDICAL ENGINEERING*
Camarillo, D. B., Shull, P. B., Mattson, J., Shultz, R., Garza, D.
2013; 41 (9): 1939-1949

- **An Instrumented Mouthguard for Measuring Linear and Angular Head Impact Kinematics in American Football.** *Annals of Biomedical Engineering*
Camarillo, D. B., Shull, P. B., Mattson, J., Yang, S., Shultz, R., Garza, D.
2013; 41 (9): 1939-1949
- **Comparing In Vivo Head Impact Kinematics from American Football with Laboratory Drop and Linear Impactors.**
Hernandez, F., Shull, P. B., Cam, B., Wu, L. c., Shultz, R., Garza, D., Camarillo, D. B.
2013
- **Model-less Feedback Control of Continuum Manipulators in Constrained Environments.** *IEEE Transactions on Robotic.*
Yip, M. C., Camarillo, D. B.
2013
- **Head Contacts in Collegiate Football Measured with an Instrumented Mouthguard.**
Camarillo, D. B., Mattson, J., Flynn, M., Yang, S., Shull, P., Shultz, R.
2012
- **In Vivo Micro-Image Mosaicing** *IEEE TRANSACTIONS ON BIOMEDICAL ENGINEERING*
Loewke, K. E., Camarillo, D. B., Piyawattanametha, W., Mandella, M. J., Contag, C. H., Thrun, S., Salisbury, J. K.
2011; 58 (1): 159-171
- **Configuration Tracking for Continuum Manipulators With Coupled Tendon Drive** *IEEE TRANSACTIONS ON ROBOTICS*
Camarillo, D. B., Carlson, C. R., Salisbury, J. K.
2009; 25 (4): 798-808
- **Task-Space Control of Continuum Manipulators with Coupled Tendon Drive** *11th International Symposium on Experimental Robotics (ISER)*
Camarillo, D. B., Carlson, C. R., Salisbury, J. K.
SPRINGER-VERLAG BERLIN.2009: 271–280
- **Configuration Tracking for Continuum Manipulators with Coupled Tendon Drive.** *IEEE Transactions on Robotics*
Camarillo, D. B., Carlson, C. R., Salisbury, J. K.
2009; 25 (4): 798-808
- **Mechanics Modeling of Tendon-Driven Continuum Manipulators** *IEEE TRANSACTIONS ON ROBOTICS*
Camarillo, D. B., Milne, C. F., Carlson, C. R., Zinn, M. R., Salisbury, J. K.
2008; 24 (6): 1262-1273
- **Vision based 3-D shape sensing of flexible manipulators** *IEEE International Conference on Robotics and Automation*
Camarillo, D. B., Loewke, K. E., Carlson, C. R., Salisbury, J. K.
IEEE.2008: 2940–2947
- **Real-Time Image Mosaicing with a Hand-Held Dual-Axis Confocal Microscope.**
Loewke, K. E., Camarillo, D. B., Piyawattanametha, W., Salisbury, J. K.
2008
- **Vision Based 3-D Shape Sensing of Flexible Manipulators.**
Camarillo, D. B., Loewke, K. E., Salisbury, J. K.
2008
- **Task-space Feedback Control of Continuum Manipulators with Coupled Tendon Drive.**
Camarillo, D. B., Carlson, C. R., Salisbury, J. K.
2008
- **Mechanics Modeling of Tendon Driven Continuum Manipulators.** *IEEE Transactions on Robotics.*
Camarillo, D. B., Milne, C. F., Carlson, C. R., Zinn, M. R., Salisbury, J. K.
2008; 24 (6): 1262-1273
- **Real-time image mosaicing with a hand-held dual-axes confocal microscope** *Conference on Endoscopic Microscopy III*
Loewke, K., Camarillo, D., Piyawattanametha, W., Breedon, D., Salisbury, K.
SPIE-INT SOC OPTICAL ENGINEERING.2008

- **Real-Time Image Mosaicing for Medical Applications** *15th Conference on Medicine Meets Virtual Reality*
Loewke, K. E., Camarillo, D. B., Jobst, C. A., Salisbury, J. K.
I O S PRESS.2007: 304–309
- **Deformable Image Mosaicing for Optical Biopsy.**
Loewke, K. E., Camarillo, D. B., Salisbury, J. K., Thrun, S.
2007
- **Deformable image mosaicing for optical biopsy** *11th IEEE International Conference on Computer Vision*
Loewke, K., Camarillo, D., Salisbury, K., Thrun, S.
IEEE.2007: 2212–2219
- **Robotic technology in surgery: past, present, and future** *AMERICAN JOURNAL OF SURGERY*
Camarillo, D. B., Krummel, T. M., Salisbury, J. K.
2004; 188 (4A): 2S-15S