

## Jason K. Moore

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Linkedin: [tinyurl.com/jkm-linkedin](http://tinyurl.com/jkm-linkedin)  
Twitter: [@moorepants](https://twitter.com/moorepants)  
Google+: [tinyurl.com/jkm-plus](http://tinyurl.com/jkm-plus)

CITIZENSHIP      United States of America

LANGUAGE      English [US] (mother tongue), Spanish [GU] (beginner), Dutch [NL] (beginner)

RESEARCH INTERESTS      Multibody dynamics, control systems, human operator control, vehicle dynamics, aircraft control, bicycle dynamics, aircraft dynamics, vehicle handling qualities, human biomechanics, gait control identification, machine design, appropriate technology, human powered machines, system identification, software engineering, wind tunnel experimentation, computational reproducibility, open science, optimal control, computer aided algebra

### ACADEMIC EMPLOYMENT

Assistant Teaching Professor (LPSOE)      **September 2015 to present**  
*Mechanical and Aerospace Engineering Department, University of California, Davis*  
(Chairs: C.P. van Dam, Steven Robinson)

Postdoctoral Research Associate      **July 2013 to August 2015**  
*Human Motion and Control Laboratory, Cleveland State University*  
(PI: Antonie van den Bogert)

Postdoctoral Research Programmer      **January 2013 to June 2013**  
*Institute for Transportation Studies, University of California, Davis*  
(PI: Tai Stillwater)

Lecturer (Unit 18)      **September 2012 to December 2012**  
*Mechanical and Aerospace Engineering Department, University of California, Davis*  
(Chair: C.P. van Dam)

Graduate Student Researcher      **September 2009 to August 2012**  
*Sports Biomechanics Laboratory, University of California, Davis*  
(PIs: Mont Hubbard, Ronald Hess)

Visiting Fulbright Scholar      **August 2008 to August 2009**  
*Bicycle Dynamics Laboratory, Delft University of Technology*  
(PI: A.L. Schwab)

Student Machine Shop Instructor      **January 2007 to June 2008**  
*Mechanical and Aerospace Engineering Department, University of California, Davis*  
(Supervisor: Jeffery Feerer)

Teaching Assistant      **March 2006 to June 2007**  
*Mechanical and Aerospace Engineering Department, University of California, Davis*  
(Instructors: Jim Schaaf, Rida Farouki)

## EDUCATION

### **University of California at Davis**, Davis, California USA

Ph.D., Mechanical and Aerospace Engineering, August 2012

- Dissertation: [Human Control of A Bicycle](#)
- Dissertation Topic: Bicycle dynamics, control, and handling qualities
- Area of Study: Multibody dynamics, control systems, biomechanics, and system identification
- Advisors: [Mont Hubbard](#), [Ron A. Hess](#), [Arend L. Schwab](#)
- Lab: [UCD Sports Biomechanics Lab](#), [TU Delft Bicycle Dynamics Lab](#)

M.Sc., Mechanical and Aeronautical Engineering, June 2007

- Advisor: [Mont Hubbard](#)
- Area of Study: Multibody dynamics, control systems, and machine design
- Lab: [Sports Biomechanics Lab](#)

### **Old Dominion University**, Norfolk, Virginia USA

B.Sc., Mechanical Engineering, December 2004

- *Magna cum Laude*
- Machine Design Specialization
- Minor in Mathematics
- Minor in Philosophy and Religious Studies

### **Tunstall High School**, Dry Fork, Virginia USA

Advanced Diploma, May 2000

- Graduated with Honors

## PROFESSIONAL ACCREDITATION

Passed the Fundamentals of Engineering Exam in Virginia

## GRANTS AND AWARDS

[Center for Educational Effectiveness](#)

- [Development of an Interactive Textbook Backed by Cloud Infrastructure to Pilot Active Computational Learning in an Upper Level Mechanical Vibrations Engineering Course](#) , 2017-2018, \$22k.

[Nation Center of Simulation in Rehabilitation Research](#), Stanford University

- [2014 NCSSR Visiting Scholarship](#), \$8k.

[SAGE Publishing](#)

- [2013 Best Paper Award](#), [Journal of Multibody Dynamics](#), \$400.

[U.S. General Services Administration](#)

- [White House Apps for Vehicles Challenge: Phase 1](#), 2013, \$2k.

[2012 Dynamic Systems and Control Conference](#)

- [Best paper in the Single Track Vehicle Dynamics and Control Session](#), 2012.

[National Science Foundation](#)

- [NSF Standard Grant: Human Control of Bicycle Dynamics with Experimental Validation and Implications for Bike Handling and Design](#), 2009-2012, \$300k.

[U.S. Department of State](#)

- [Fulbright Grant to the Netherlands](#), 2008-2009, \$10k.

RESEARCH  
EXPERIENCE

University of California, Davis

- Summer Graduate Student Researcher Award, 2010
- Campus Sustainability Grant (Human Powered Utility Vehicle Pilot Program), 2008
- Campus Sustainability Grant (Davis Bike Church Physical Space Renovation), 2008
- Graduate Student Association Travel Award, 2008
- Institute for Transportation Studies Travel Award, 2008
- Campus Sustainability Grant (Pedal Powered Charging Table), 2007
- Joseph Beggs Fellowship for Kinematics, 2006–2007
- MAE Department Fellowship, UC Davis, 2005–2006

Old Dominion University

- Governor’s Technology Scholarship, Full Tuition, \$16k, 2000–2004.

**University of California at Davis**, Davis, California USA

*Faculty*

**September 2015 to Present**

- Optimal bicycle design: mentored one graduate and two undergraduates students in an experimental study on bicycle handling, developed and optimization algorithm to discover optimal handling bicycle designs
- Smartphone rowing data backed coach: Worked with local startup and one undergraduate in a data science and dynamics project to predict rowing motions from smartphone data
- Design of an efficient human powered irrigation pump: mentored one graduate student in this research/design effort, partnered with World Bicycle Relief and Buffalo Bikes
- Identification of human standing control: mentored four undergraduates in the design of a double pendulum balancing robot

*Postdoctoral Researcher and Programmer*

**February 2013 to June 2013**

- Developed a cross platform smart phone/tablet application for realtime automobile driver fuel economy feedback. This application was used to conduct an experiment with 200 drivers in San Francisco on driver behavior: SmartDrive
- Won \$2K in the first Phase of the White House’s Apps for Vehicles Challenge with simpler version of SmartDrive for consumer use, Drive5
- Designed statistical Kalman filter based fuel economy prediction algorithms based on smart phone sensor data.

*Graduate Student Researcher*

**September 2005 to August 2012**

- Graduate Student Researcher at the Sports Biomechanics Lab.
- Member of UC Davis’s Institute for Transportation Studies.
- Co-wrote and co-managed a three year Nation Science Foundation grant.
- Developed a custom instrumented bicycle and performed control experiments to characterize the human control system in the bicycling balancing and tracking task.
- Developed numerous open source software packages.
- Mentored five graduate students during summer internships in experimental, theoretical, and computational dynamics.
- Mentored approximately ten undergraduate student interns in a lab setting.
- Mentored four undergraduates in their senior design project.
- Led multiple tours of the Sport Biomechanics Lab.
- Involved in the graduate student recruitment week.
- Designed and administered the lab website.
- Co-founded Davis Open Science.
- Co-wrote and awarded two Google Summer of Code grants (2011, 2012).

- Organized weekly lab meetings.
- Refereed an article for Vehicle System Dynamics.
- Organized and co-chaired both an invited and special session at the 2012 ASME DSCC conference.
- Featured in “Science of Balancing a Bike” by the UC Office of the President.
- Featured in “Science of Riding a Bicycle” video by KQED Quest.

*Biomedical Research Engineer*

**August 2007 to August 2009**

- Designed and supervised the fabrication of a cell shearing device for the UCD Biomedical Passerini Lab.

**Cleveland State University**, Cleveland, Ohio USA

*Post Doctoral Research Associate*

**July 2013 to August 2015**

- PI: Ton van den Bogert
- Lab: Human Motion and Control Lab
- Identified control schemes in human walking using data driven approaches.
- Developed and ran multi-subject gait experiments with a modern gait lab.
- Developed software for gait data analysis and simulation.
- Developed human walking computational models.
- Mentored several undergraduate and graduate students in research projects.
- Mentored undergraduate students in their senior design projects.
- System administrator for the lab web site.
- Developed a open data paper for a very large gait dataset.

**Delft University of Technology**, Delft, Zuid-Holland Netherlands

*Fulbright Visiting Scholar and Researcher*

**August 2008 to August 2009**

- Ph.D. researcher at the [Bicycle Dynamics Laboratory](#).
- Co-developed an instrumented bicycle with video logging and accompanying software.
- Used the instrumented bicycle in various experiments on and off the treadmill resulting in two conference papers.
- Participated in canceled gyro, negative trail bicycle experiments that eventually resulted a Science publication.
- Lead motion capture study on bicycle/rider kinematics resulting in two conference papers and one peer reviewed journal article.
- Developed a systematic method of measuring the physical properties of a bicycle and rider resulting in two conference papers.
- Gave a colloquium talk on the year’s research.
- Researched the bicycle transportation system in the Netherlands, kept an informal blog, attended the Velo-City Brussels conference, and gave a talk on the subject at the UCD Institute of Transportation Studies.

TEACHING  
EXPERIENCE

**University of California at Davis**, Davis, California USA

*Assistant Teaching Professor, LPSOE*

**September 2015 to Present**

- Taught “Introduction to Mechanical Vibrations”, Fall 2016/2017, 20-40 students, upper level elective, 1 teaching assistant, redesigned entire course second time teaching it to focus on active learning and computational thinking, developed an [interactive open access textbook](#)
- Taught Multibody Dynamics, Fall 2017, 12 students, graduate course, custom software, PyDy, developed and used in the course

- Taught Mechanical Systems Design Project, Winter/Spring 2016/2017, 140-160 students, 4 teaching assistants, capstone design course, mentored 55+ projects for industry clients
- Taught Mechanical and Aerospace Engineering Graduate Seminar, Spring 2017, invited 10 guest speakers for 1 hour seminars
- Taught Mechanical Design, Fall 2015/2016, required upper level course, 20-35 students
- Participated in the Engineering Education Learning Community
- Mentored 2 graduate students, 16 undergraduates
- Member of two MS committees

*Lecturer* **August 2012 to December 2012**

- Taught “Engineering Graphics in Design”, 120 students, 4 Teaching Assistants
- Topics: Design, Sketching, Drawing, Drafting, Solid Modeling, CAD

*Graduate Student Researcher* **September 2005 to August 2012**

- Mentored five graduate students during summer internships in experimental, theoretical, and computational dynamics.
- Mentored approximately ten undergraduate student interns in a lab setting.
- Mentored four undergraduates in their senior design project.
- Led multiple tours of the Sport Biomechanics Lab.

*Machine Shop Supervisor* **January 2007 to June 2008**

- Supervised the College of Engineering student machine shop.
- Helped students with machining and fabrication projects.
- Taught the shop safety class.
- Fabricated various doodads and gizmos for the shop.
- Organized the shop.
- Worked on design projects for various campus research groups.

*Teaching Assistant* **March 2006 to June 2007**

- EME 150B, Mechanical Design (Spring 2006): Worked with student groups during the discussion period on their design projects, graded homework assignments, and held weekly office hours.
- EME 50, Manufacturing Processes (Fall 2006 and Winter 2007): Taught hands-on machining and fabrication during weekly lab sections, graded homework assignments and tests, and organized the end of quarter party.
- ENG 4, Engineering Graphics (Spring 2007): Led lab sections with lectures in sketching and 2D/3D computer aided design with modern CAD software.

*Davis Open Science Co-founder* **February 2010 to June 2013**

- Co-founded the graduate student group.
- Co-hosted several seminars and panels with prominent speakers in Open Science.
- Worked with various faculty and staff on open science projects.
- Led workshops on open science topics.

*Action Research Team Facilitator* **March 2007 to December 2007**

- Led group of students in the design and construction of a pedal powered desk laptop charging station.
- Competed in Google and Specialized’s Innovate or Die Contest.
- The project was featured in many articles and news broadcasts.
- Featured in the book [Human Powered Home](#) by Tamara Dean.

*Assistant Action Research Team Facilitator* **March 2006 to June 2006**

- Co-led a group of students through the process of starting a mock non-profit group.

*Reader* **September 2006 to December 2006**

- Graded mechanical design assignments (EME 150B).

### **Software Carpentry**, Everywhere, Planet Earth

*Volunteer Instructor* **January 2015 to now**

- Lead two workshops on computation for scientists and engineers.
- Developed lesson plans.
- Passed the instructor certification.

### **Cleveland State University**, Cleveland, Ohio USA

*Post Doctoral Research Associate* **July 2013 to December 2014**

- Mentored graduate students.
- Mentored undergraduate students in their senior design projects.
- Led “Open Source Code Nights” workshops with the undergraduate IEEE group.
- Gave tutorials on multibody dynamics and control to graduate and undergraduate students.

### **Delft University of Technology**, Delft, Zuid-Holland Netherlands

*Fulbright Visiting Scholar and Researcher* **August 2008 to August 2009**

- Mentored undergraduate students in their senior design projects.

### JOURNAL PUBLICATIONS

- [1] Jason K. Moore and Antonie van den Bogert. “opty: Software for trajectory optimization and parameter identification using direct collocation”. In: *Journal of Open Source Software* (2017). Under review.
- [2] Aaron Meurer et al. “SymPy: symbolic computing in Python”. en. In: *PeerJ Computer Science* 3 (Jan. 2017), e103. ISSN: 2376-5992. DOI: 10.7717/peerj-cs.103. URL: <https://peerj.com/articles/cs-103>.
- [3] Jason K. Moore, Sandra K. Hnat, and Antonie J. van den Bogert. “An elaborate data set on human gait and the effect of mechanical perturbations”. In: *PeerJ* 3 (Apr. 2015), e918. ISSN: 2167-8359. DOI: 10.7717/peerj.918.
- [4] Chris Dembia, Jason K. Moore, and Mont Hubbard. “An object oriented implementation of the Yeadon human inertia model”. In: *F1000Research* 3.233 (2015). [v2; ref status: indexed, <http://f1000r.es/558>]. DOI: 10.12688/f1000research.5292.2.
- [5] Arend L. Schwab et al. “Rider control identification in bicycling using lateral force perturbation tests”. In: *Proceedings of the Institution of Mechanical Engineers, Part K: Journal of Multi-body Dynamics* 227.4 (Aug. 2013). 2013 SAGE Best Paper Award, *Journal of Multibody Dynamics*, pp. 390–406. DOI: 10.1177/1464419313492317.
- [6] Ronald Hess, Jason K. Moore, and Mont Hubbard. “Modeling the Manually Controlled Bicycle”. In: *IEEE Transactions on Systems, Man, and Cybernetics - Part A: Systems and Humans* 42.3 (2012), pp. 545–557. DOI: 10.1109/TSMCA.2011.2164244.
- [7] Jason K. Moore et al. “Rider motion identification during normal bicycling by means of principal component analysis”. In: *Multibody System Dynamics* 25 (2 2011), pp. 225–244. ISSN: 1384-5640. DOI: 10.1007/s11044-010-9225-8.

## THESES

- [1] Jason K. Moore. “Human Control of a Bicycle”. PhD thesis. Davis, CA: University of California, Davis, Aug. 2012. URL: <http://moorepants.github.io/dissertation>.

## PREPRINTS

- [1] Jason K Moore and Antonie J. van den Bogert. “Perturbed Standing Controller Parameter Identification: A comparison of Methods”. In: (2015). Preprint. URL: <https://github.com/csu-hmc/inverted-pendulum-sys-id-paper>.
- [2] Jason K Moore and Antonie J. van den Bogert. “Direct Identification of Human Gait Control”. In: (2015). URL: <https://github.com/csu-hmc/gait-control-direct-id-paper>.
- [3] Jason K Moore, Sandra K. Hnat, and Antonie J. van den Bogert. “An elaborate data set on human gait and the effect of mechanical perturbations”. In: *PeerJ PrePrints 2* (Dec. 2014). Preprint, e700v2. ISSN: 2167-9843. DOI: [10.7287/peerj.preprints.700v2](https://doi.org/10.7287/peerj.preprints.700v2). URL: <https://dx.doi.org/10.7287/peerj.preprints.700v2>.
- [4] Jason K Moore and Mont Hubbard. “Kinetic and Kinematic Measurements from an Instrumented Bicycle during different maneuvers on and off the treadmill”. In: (2015). Preprint. URL: <https://github.com/moorepants/bicycle-data-paper>.
- [5] Jason K Moore and Mont Hubbard. “Methods for elimination of crosstalk and inertial effects in bicycle steer torque estimation”. In: (2015). Preprint. URL: <https://github.com/moorepants/steer-torque-manuscript>.

## PEER REVIEWED CONFERENCE PROCEEDINGS

- [1] Jason K. Moore, Mont Hubbard, and Ronald A. Hess. *Optimal bicycle design to maximize handling and safety*. Sept. 2017. DOI: [10.6084/m9.figshare.5405242.v1](https://doi.org/10.6084/m9.figshare.5405242.v1).
- [2] Scott W. Kresie et al. *Experimental Validation of Bicycle Handling Prediction*. Sept. 2017. DOI: [10.6084/m9.figshare.5405233.v1](https://doi.org/10.6084/m9.figshare.5405233.v1).
- [3] Jason Moore, Mont Hubbard, and Ronald A. Hess. “An Optimal Handling Bicycle”. In: *Proceedings of the 2016 Bicycle and Motorcycle Dynamics Conference*. Figshare, Sept. 2016. DOI: [10.6084/m9.figshare.3806310.v1](https://doi.org/10.6084/m9.figshare.3806310.v1).
- [4] Jason K. Moore and Mont Hubbard. “Methods for elimination of crosstalk and inertial effects in bicycle and motorcycle steer torque estimation”. In: *Proceedings of Bicycle and Motorcycle Dynamics: Symposium on the Dynamics and Control of Single Track Vehicles*. Narashino, Chiba, Japan, Nov. 2013.
- [5] Jason K. Moore and Mont Hubbard. “Identification of open loop dynamics of a manually controlled bicycle-rider system”. In: *Proceedings of Bicycle and Motorcycle Dynamics: Symposium on the Dynamics and Control of Single Track Vehicles*. Narashino, Chiba, Japan, Nov. 2013.
- [6] Ronald A. Hess and Jason K. Moore. “Estimating Parameters of the Structural Pilot Model Using Simulation Tracking Data”. In: *AIAA Guidance, Navigation, and Control Conference*. 2013.
- [7] Gilbert Gede et al. “Constrained Multibody Dynamics With Python: From Symbolic Equation Generation to Publication”. In: *the ASME 2013 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference*. 2013.



- [8] Arend Schwab, Peter de Lange, and Jason Moore. “Rider Optimal Control Identification in Bicycling”. In: *Proceedings of the 5th Annual Dynamic Systems and Control Conference and 11th Annual Motion and Vibration Conference*. ASME. Fort Lauderdale, Florida, USA, Oct. 2012.
- [9] A. L. Schwab et al. “Rider control identification in bicycling, parameter estimation of a linear model using lateral force perturbation tests”. In: *Proceedings of the IMSD2012 - The 2nd Joint International Conference on Multibody System Dynamics*. Stuttgart, Germany., May 2012.
- [10] Jason K. Moore et al. “An Accurate Method of Measuring and Comparing a Bicycle’s Physical Parameters”. In: *Proceedings of Bicycle and Motorcycle Dynamics: Symposium on the Dynamics and Control of Single Track Vehicles*. Delft, Netherlands, Oct. 2010.
- [11] Jason K. Moore et al. “Statistics of bicycle rider motion”. In: *Procedia Engineering 2.2* (2010). The Engineering of Sport 8 - Engineering Emotion, pp. 2937–2942. ISSN: 1877-7058. DOI: DOI : 10 . 1016 / j . proeng . 2010 . 04 . 091. URL: <http://www.sciencedirect.com/science/article/B9869-508WXJK-37/2/a5dd5a57c5ab57f73a1ccd739068f4ae>.
- [12] Dale L. Peterson et al. “Low-power, modular, wireless dynamic measurement of bicycle motion”. In: *Procedia Engineering 2.2* (2010). The Engineering of Sport 8 - Engineering Emotion, pp. 2949–2954. ISSN: 1877-7058. DOI: DOI : 10 . 1016 / j . proeng . 2010 . 04 . 093. URL: <http://www.sciencedirect.com/science/article/B9869-508WXJK-39/2/2a6855e265dc84c04b2e53af29169e26>.
- [13] Jason K. Moore et al. “A Method for Estimating Physical Properties of a Combined Bicycle and Rider”. In: *Proceedings of the ASME 2009 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference, IDETC/CIE 2009*. ASME. San Diego, CA, USA, Aug. 2009.
- [14] J. D. G. Kooijman, A. L. Schwab, and Jason K. Moore. “Some Observations on Human Control of a Bicycle”. In: *Proceedings of the ASME 2009 International Design and Engineering Technical Conferences & Computers and Information in Engineering Conference*. 2009.
- [15] J. K. Moore, J. D. G. Kooijman, and A. L. Schwab. “Rider motion identification during normal bicycling by means of principal component analysis”. In: *Proceedings of Multibody Dynamics 2009, ECCOMAS Thematic Conference*. Ed. by K. Arczewski and M. Wojtyra J. Frączek. Warsaw, Poland, June 2009.
- [16] Jason Moore and Mont Hubbard. “Parametric Study of Bicycle Stability”. In: *The Engineering of Sport 7*. Ed. by Margaret Estivalet and Pierre Brisson. Vol. 2. International Sports Engineering Association. Springer Paris, 2008. DOI: 10.1007/978-2-287-99056-4\_39.

CONFERENCE  
ABSTRACTS

- [1] Jason K Moore and Antonie J. van den Bogert. “Quiet Standing Control Parameter Identification with Direct Collocation”. In: *XV International Symposium on Computer Simulation in Biomechanics*. Edinburgh, UK, July 2015.
- [2] Jason K Moore, Sandra K. Hnat, and Antonie J. van den Bogert. “Identification of human control during perturbed walking”. In: *Midwest American Society of Biomechanics Regional Meeting*. Akron, Ohio, USA, 2014.
- [3] Jason K. Moore, Dale L. Peterson, and Mont Hubbard. “Influence of rider dynamics on the Whipple bicycle model”. In: *Proceedings of the 11th International Symposium on Computer Simulation in Biomechanics*. ISB. Tainan, Taiwan, June 2007.



## SOFTWARE

- [1] Jason K. Moore and Kenneth Lyons. *Resonance: Learning Mechanical Vibrations Through Computation*. University of California, Davis. 2017. URL: <http://github.com/moorepants/resonance>.
- [2] Jason K. Moore. *Opty: A library for optimal control and parameter estimation with direct collocation*. Cleveland State University. 2014. URL: <http://github.com/csu-hmc/opty>.
- [3] Jason K. Moore et al. *Gait Analysis Tool Kit: A Python Library for Gait Analysis*. 2014. URL: <http://pypi.python.org/pypi/gaitanalysis toolkit>.
- [4] Jason K. Moore. *BicycleDataProcessor: Data storage and processing library for an instrumented bicycle*. University of California, Davis. 2012. URL: <http://pypi.python.org/pypi/BicycleDataProcessor>.
- [5] Christopher Dembia and Jason K. Moore. *Yeadon: A Python Library For Human Inertia Estimation*. 2011. URL: <http://pypi.python.org/pypi/yeadon/>.
- [6] Jason K. Moore. *BicycleParameters: A Python library for bicycle parameter estimation and analysis*. 2011. URL: <http://pypi.python.org/pypi/BicycleParameters>.
- [7] Jason K. Moore. *BicycleDAQ: Data acquisition application for an instrumented bicycle*. University of California, Davis. 2011. URL: <http://github.com/moorepants/BicycleDAQ>.
- [8] Jason K. Moore. *DynamicistToolKit: A Python library for dynamics and controls*. 2011. URL: <http://pypi.python.org/pypi/DynamicistToolKit>.
- [9] Gilbert Gede et al. *PyDy: A symbolic multi-body dynamics analysis package written in Python*. PyDy. 2009. URL: <http://pydy.org>.
- [10] SymPy Development Team. *SymPy: Python library for symbolic mathematics*. 2006. URL: <http://www.sympy.org>.

## ACADEMIC SERVICE

- UCD MAE Undergraduate Committee
- UCD MAE Website Committee
- Co-organizer of the 6th Annual International Cycling Safety Conference.
- Served on the organizing and scientific committees for the 2016 Bicycle and Motorcycle Dynamics Conference in Milwaukee, Wisconsin.
- Volunteer instructor for Software Carpentry
- Co-organizer of Cleveland's "North Coast Biomechanics and Brew" group (2014).
- Served on the scientific committee for the 2013 Bicycle and Motorcycle Dynamics Conference.
- Organized and mentored for five Google Summer of Code (Python Software Foundation/SymPy/PyDy).
- Organized and co-chaired both an invited and special session on single track vehicle dynamics at the 2012 ASME DSCC conference.

## ARTICLE REVIEWS

- Reviewed "The effect of tyre and rider properties on the stability of a bicycle" by Bulsink, Vera, et. al, for *Advances in Mechanical Engineering*, 2015.
- Reviewed "Changing the bicycle seat height: Effects on rider control." for the *European Journal of Sports Sciences*, 2015.
- Reviewed "Gyro device for bicycle handling assessment: A reliability study" by Fonda, Borut, et. al for the *Journal of Applied Biomechanics*, 2015.
- Reviewed "On the influence of tyre and rider properties on the stability of a bicycle." by Vera Bulsink, et. al, for *Vehicle System Dynamics*, 2014.

- Reviewed “Are subject-specific musculoskeletal models robust to the uncertainties in parameter identification?” by Giordano Valente, et. al for PLoS One, 2014.
- Reviewed four papers for the Bicycle and Motorcycle Dynamics Conference 2013 proceedings, July 2013.
- Reviewed “Experimental and Numerical Analysis of Rider Motion in Weave Conditions” Doria, Alberto, et. al for Vehicle System Dynamics, 2011.

TUTORIALS AND WORKSHOPS

**SCIPY 2017**, Austin, Texas, USA

*Automatic Code Generation With SymPy* (2,015 views) **July 10, 2017**

**Delta Stewardship Council** Sacramento, California, USA

*Software Carpentry Workshop* **May 18–19, 2017**

**iHub** Nairobi, Kenya

*Software Carpentry Workshop* **June 17–18, 2016**

**UCI Data Science Initiative** Irvine, California, USA

*Software Carpentry Workshop* **February 21–22, 2015**

**SCIPY 2016**, Austin, Texas, USA

*Simulating Robot, Vehicle, Spacecraft, and Animal Motion* (3,355 views) **July 14, 2016**

**SCIPY 2015**, Austin, Texas, USA

*Multibody Dynamics and Control with Python* (3,817 views) **July 18, 2015**

**SCIPY 2014**, Austin, Texas, USA

*Multibody Dynamics and Control with Python* (3,057 views) **July 6, 2014**

**PYCON 2014**, Montreal, Quebec, Canada (2,608 views)

*Dynamics and Control with Python* **April 9, 2014**

**MASB 2014**, Akron, Ohio, USA

*Simulation and Control of Biomechanical Systems with Python* **March 9, 2014**

INVITED TALKS

**TU Delft**, Delft, Netherlands

*Identification of human control during walking* **June 6, 2014**

**U.S. Bicycling Hall of Fame**, Davis, CA

*How We Ride Bikes* with Luke Peterson, Mont Hubbard, and Ron Hess **October 19, 2011**

**UCD Tahoe Environmental Research Center**, Lake Tahoe, NV

*How We Ride Bikes* with Luke Peterson and Mont Hubbard **May 12, 2011**

**Fulbright FAST Conference**, San Francisco, CA

*Bicycling in the Netherlands and Europe, policies and practices: What can America learn from them.* **March 12, 2010**

**UC Davis D-Lab**, Davis, CA

*Use of Human Power in the Developing World* **January 31, 2013,**  
**January 31, 2012, January 25, 2011, January 26, 2010**

**TU Delft Mechanics Colloquium**, Delft, Netherlands

*A First Look at Rider Biomechanics while Controlling a Bicycle* **June 4, 2009**

## TALKS

**SacPy**, Sacramento, California, USA

*Resonance: An Interactive Textbook and Software Library for Learning About Mechanical Vibrations* **November 9, 2017**

**EME 1 Guest Lecture**, Davis, California, USA

*What the Bicycle Can Tell Us About Human Control* **November 28, 2016**

**BMD 2016**, Milwaukee, Wisconsin, USA

*An Optimal Handling Bicycle* **September 21, 2016**

**Cleveland State University Human Motion and Control Seminar**, Cleveland, Ohio, USA

*Reproducible Scientific Computing with Open Software and Open Data* **September 17, 2014**

**2014 NCSSR Visiting Scholar Kickoff**, Stanford, California, USA

*Indirect identification of human control during walking* **July 15, 2014**

**Dynamic Walking 2014**, Zurich, Switzerland

*Identification of human control during walking* **June 10, 2014**

**MASB 2014**, Akron, Ohio, USA

*Identification of human control during walking* **November 13, 2013**

**BMD 2013**, Narashino, Chiba, Japan

*Methods for Elimination of Crosstalk and Inertial Effects in Bicycle and Motorcycle Steer Torque Estimation* **November 13, 2013**

**BMD 2013**, Narashino, Chiba, Japan

*Identification of Open Loop Dynamics of a Manually Controlled Bicycle-Rider System* **November 11, 2013**

**SciPy 2013**, Austin, Texas, USA

*Estimating and Visualizing the Inertia of the Human Body with Python* **June 27, 2013**

**SciPy 2013**, Austin, Texas, USA

*Dynamics with SymPy Mechanics* **June 27, 2013**

**ASME DSCC 2012**, Fort Lauderdale, Florida, USA

*The Future of Bicycle and Motorcycle Dynamics* **October 18, 2012**

**Velo-city Global 2012**, Vancouver, British Columbia, Canada

*Time and Energy Penalties of Squiggly Bike Routes* with Ted Buehler **June 28, 2012**

**MAE Exit Seminar**, Davis, CA, USA

*Human Control of a Bicycle* **May 15, 2012**

**UCD ITS Seminar**, Davis, CA

*Bicycling in the Netherlands and Europe, policies and practices: What can America learn from them.* with Eva Heinen **October 23, 2009**

**UCD MAE Seminar**, Davis, CA

*A First Look at Rider Biomechanics while Controlling a Bicycle* **October 29, 2009**

**UCD MAE Qualifying Exam**, Davis, CA

*Human Control of a Bicycle* **October 9, 2009**

**ASME IDETC/CIE 2009**, San Diego, CA

*A Method for Estimating the Physical Properties of a Combined Bicycle and Rider*  
**August 31, 2009**

**Multibody Dynamics 2009**, Warsaw, Poland

*Rider Motion Identification During Normal Bicycling By Means of Principal Component Analysis* **July 1, 2009**

**Fulbright Mid Year Presentation**, Amsterdam, Netherlands

*Jason Moore, In The Netherlands...* **February 5, 2009**

**ISEA 2008**, Biarritz, France

*Parametric Study of Bicycle Stability* **June 6, 2008**

PROFESSIONAL  
EXPERIENCE

**Plotly**, Montreal, Quebec, Canada USA

*Consultant* **July 2015**

- Developed a Jupyter notebook demonstrating the use of Plotly tools in control engineering.

**Old Dominion University, Norfolk, Virginia USA**

*Langley Full Scale Tunnel Design Engineer* **June 2004 to August 2005**

- Extensive design, modeling and drafting with Autodesk Inventor.
- Designed a portable floor system for a car balance.
- Designed a six degree of freedom full scale car balance.
- Wrote stress analysis reports for NASA specifications.
- Test-model design, fabrication and repair.
- Support in daily activities (test preparation, taking data, etc.).

*Maglev Tram Design Engineer* **May 2004 to January 2005**

- Created a reference CAD model of a full-scale magnetic levitation train car using AutoCAD Mechanical Desktop.

*ODU HPV Team Project Lead* **September 2003 to January 2005**

- Lead and managed a mechanical engineering senior design project.
- Designed and constructed a human powered land vehicle.
- Focused on bicycle frame, controls, stability, and drive train design
- Received 6th place out of 20 as a rookie team at the ASME Human Powered Vehicle Challenge.
- Website designer and maintainer.

*ODU SAE Formula Team Design Engineer* **2001 to 2002**

- Helped design and fabricate a scaled formula race car.
- Extensive design, modeling and drafting with AutoCAD Mechanical Desktop.
- Designed and fabricated the drive train and composite body.
- Website designer.

**Bauer Compressors, Norfolk, Virginia USA**

*Mechanical Design Engineer Intern* **June 2003 to December 2003**

- Extensive 3D modeling with Autodesk Inventor: modeled complex air compressor systems.
- Sheet metal design and fabrication.
- V-belt drive designs.
- Oil filtration system design.
- Designed parts and prepared drawings for fabrication.

**Area Access, Norfolk, Virginia USA**

*Elevator Mechanic Assistant* **May 2002 to August 2002**

- Installed and repaired elevators and various accessibility machines.
- Exposed to various electrical and mechanical systems.

**Danville Community College, Danville, Virginia USA**

*CNC Mill Operator* **June 2001 to August 2001**

- Learned G-code/Manual Programming.
- Learned FeatureCam 3D CAD/CAM software.
- Programmed and operated a HAAS 3-axis mill.

**Mark D. Moore Construction Company, Danville, Virginia USA**

*Carpenter* **1995 to 2001**

- Residential house construction
- Framing, finishing, painting, drywall, hardwood floors, masonry

**Davis Bike Collective**, Davis, CA USA

*Bicycle Mechanic, Teacher and Organizer* **September 2005 to June 2013**

- Volunteered bi-weekly as a teaching mechanic.
- Co-founded a consensus based non-profit.
- Co-wrote bylaws and setup the legal non-profit.
- Raised thousands of dollars in donations and grants.
- Organized conferences, parties, fundraisers, bike rides, work parties, outreach events.
- Organized two 1500+ attendee beer tasting and movie events with New Belgium Brewery.
- Web site maintenance, shift scheduling, handled distributor orders, managed email listservs.
- Lead the workshop series “Open Bike Night” for one year.

**Davis Bicycles!**, Davis, CA USA

*Volunteer* **September 2009 to June 2013**

- Administer the organization’s websites [1] and [2].
- Lobby city council for bicycle amenities.
- Worked directly with city staff on various projects.

**Maya Pedal**, San Andres Itzapa, Guatemala

*Volunteer Engineer* **Summer 2007**

- Constructed pedal powered machines (i.e. blender, corn dekerneler/grinder, etc).
- Design work on a macadamia nut sheller.
- Repaired bicycles.
- Shop organization: tool boards, bike graveyard.

**Whirlwind Wheelchair International**, Lusaka, Zambia

*Volunteer Engineer* **Summer 2006**

- Worked at the Disacare Wheelchair Center.
- Worked on the design and fabrication team for a bicycle ambulance trailer.
- Fixture design and training.

**Virginia Beach Public Schools**, Virginia Beach, VA

*Volunteer Mentor* **2004**

- Assisted high schools students with an engineering design competition.

**UC Davis Institute for Transportation Engineers**, Davis, CA

*Tour Leader* **December 2006**

- Organized a group bicycle ride and museum tour.

**ODU College of Engineering**, Norfolk, VA

*Tour Guide* **February 2004**

- Led open house tours for middle school children.

## Davis Bicycle Commission, Davis, CA

### *Bicycle Counter*

- Participated in bicycle usage data collection.

### FABRICATION SKILLS

Extensive machining and fabrication experience: milling, turning, welding (MIG, TIG, ARC, Torch, Brazing), wood working, sheet metal work

### SOFTWARE PROFICIENCIES

Extensive drafting, solid modeling, CAD, CAM, and FEA experience. Proficient in: CADKEY, AutoCAD, AutoCAD Mechanical Desktop, Autodesk Inventor, Feature-CAM 3D, IntelliCAD, PATRAN/NASTRAN, PRO-Engineer/PRO-Mechanica, GMAX, CNC/G-code, OnShape

Programming Languages (in approximate order of proficiency): Python, MATLAB, R, BASH, C, Javascript, C++, Lua

Web development: HTML, CSS, Javascript, Pelican, Hyde, Sphinx, Flask, Amazon Web Services, Ubuntu Server, Apache, NGinx, Plone, Wordpress, Joomla, Homesite, Microsoft Front Page, Macromedia Dreamweaver

Websites that I currently administer: moorepants.info [Hyde], Sports Biomechanics Lab [Plone 3], moorepants [HTML]. 2017 ICSC [Wordpress], PyDy [Sphinx]

Websites that I developed but no longer administer: hmc.csuohio.edu [Plone 4], N Street Cohousing [Plone 4], Davis Bike Collective [Joomla & Wordpress], BikeDavis.info [Wordpress], smartdrive.ucdavis.edu, drive5.us [Flask], clevelandwiki.org [Django], ODU HPV [HTML],

Dynamics and Simulation: SymPy Mechanics, SciPy, MATLAB/Simulink, Working Model, Autolev, Axl/CampG, Opensim, Simbody

Computational: SciPy, NumPy, Uncertainties, Pandas, Cython, IPOPT, CMA-ES, SymPy, MATLAB, MathCAD

Instrumentation: National Instruments products including LabVIEW, MatLab DAQ Toolbox, Serial Protocols

Data: HDF5, PyTables, MySQL, MariaDB, SQLite, MongoDB

Graphics: Matplotlib, R, MATLAB, GIMP, Inkscape, Paint Shop Pro, Macromedia Fireworks, Blender, GMAX

Operating Systems: Linux (Ubuntu 8.04-17.10 and other distros), Microsoft Windows (3.1-7), DOS

Utilities: FTP, Version Control (Git/Mercurial/Subversion), SSH, BASH

Reference management: BIB<sub>T</sub>E<sub>X</sub>, JabRef, Zotero, Mendeley, Endnote

Word processing: Vim, L<sup>A</sup>T<sub>E</sub>X, Google Docs, LibreOffice Writer, TeXnic Center, Microsoft Word



## REFERENCES

### Academic Research

- Dr. Antonie J. van den Bogert *Post Doctoral Supervisor* Professor, Cleveland State University, Mechanical Engineering Department, 1960 E. 24th St., SH 232 Cleveland, Ohio 44115, +01-216-687-5329, a.vandenbogert@csuohio.edu
- Dr. Mont Hubbard, *MSc and PhD advisor*, Professor, University of California, Davis, Mechanical and Aerospace Engineering Department, One Shields Avenue, Davis, CA 95616, +01-530-752-6450, mhubbard@ucdavis.edu
- Dr. Ronald Hess, *PhD advisor*, Professor, University of California, Davis, Mechanical and Aerospace Engineering Department, One Shields Avenue, Davis, CA 95616, +01-530-752-1513, rahess@ucdavis.edu
- Dr. Arend Schwab, *Fulbright and PhD advisor*, Professor, Delft University of Technology, Mekelweg 2, NL 2628 CD Delft, The Netherlands, +31 15 27 82701, a.l.schwab@tudelft.nl
- Dr. Luke Peterson, *Colleague at UCD*, dlpeterson@ucdavis.edu
- Dr. Jodi Kooijman, *Colleague at TU Delft*, jodikooijman@gmail.com

### Teaching

- Dr. Michael Hill *New Faculty Mentor*, Professor, University of California, Davis, Mechanical and Aerospace Engineering Department, One Shields Avenue, Davis, CA 95616,
- Dr. Steven Velinsky *Capstone Design Co-Instructor*, Distinguished Professor, University of California, Davis, Mechanical and Aerospace Engineering Department, One Shields Avenue, Davis, CA 95616,
- Dr. Jim Schaaf, *TA and Lecturer supervisor*, Continuing Lecturer, University of California, Davis, Mechanical and Aerospace Engineering Department, One Shields Avenue, Davis, CA 95616, +01-530-752-5548, jas@ucdavis.edu
- Dr. Rida Farouki, *TA supervisor*, Professor, University of California, Davis, Mechanical and Aerospace Engineering Department, One Shields Avenue, Davis, CA 95616, +01-530-752-1779, farouki@ucdavis.edu

### Engineering

- Dr. Tai Stillwater, *SmartDrive and Pedal Desk*, Postdoctoral Researcher, Institute of Transportation Studies, University of California, Davis, 2028 Academic Surge, One Shields Avenue, Davis, CA, 95616, tstillwater@ucdavis.edu
- Matthew Seitzler, P.E. *Colleague*, Professional Engineer, at Davis Energy Group, Davis, CA, matt@sre-engineering.com
- Dr. Drew Landman, *LFST supervisor and undergraduate mentor*, Professor, Old Dominion University, Mechanical and Aerospace Engineering, 1311 Engr and Comp Sci Bldg, Norfolk, VA 23529, +01-757-683-6008, dlandman@odu.edu
- Dr. Anthony Passerini, *Cell shearing project supervisor*, Assistant Professor, University of California, Davis, Biomedical Engineering Department, One Shields Avenue, Davis, CA 95616, +01-530-754-6715, agpasserini@ucdavis.edu
- John Dwyer, *Bauer Compressors supervisor*, Engineer Department Manager, john.dwyer@bauercomp.com

### Community Organizing

- Dr. Debbie Niemeier, *ICSC 2017 Co-Organizer*, Davis, CA, dniemeier@ucdavis.edu
- Dr. Robb Davis, *Mayor of Davis, CA*, Davis, CA, rdavis@cityofdavis.org
- Dr. Sarah McCullough, *colleague at the Davis Bike Collective*, UC San Diego, smcc@ucdavis.edu