Sven Bambach http://homes.sice.indiana.edu/sbambach

Contact Information

Postdoctoral Research Associate
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Research Interests

My main research interest is computer vision, i.e. the intersection of computer science, machine learning and artificial intelligence that investigates methods of analyzing and understanding the visual world. I am particularity excited to harness the potential of wearable camera systems. I believe that such cameras provide a uniquely naturalistic insight into how a person interacts with the world and, since they can now be implemented with lightweight hardware, wearable cameras are becoming interesting tools across many areas in academia (e.g. research in human behavior, psychology, vision) and industry (e.g. smart glasses, police body cameras). I am also very interested in exploring how to apply insights on human learning to machine learning and vice versa. I believe collecting dense and naturalistic behavioral data (e.g. the field of view of a toddler exploring new toys) and analyzing it with novel computational models (e.g. deep neural networks) is a promising new research direction.

Research statement: https://goo.gl/K1HF9a

Education

- **Ph.D.** in Computer Science and Cognitive Science (joint degree) — Sept. 2016
  Indiana University, Bloomington, IN
  Dissertation: Analyzing Hands with First-Person Computer Vision
  Committee: David Crandall (chair), Chen Yu (co-chair), Linda B. Smith, Michael Ryoo
- **M.S.** in Computer Science — May 2013
  Indiana University, Bloomington, IN
  GPA: 4.0
- **B.Eng.** in Media and Imaging Technology — Nov. 2010
  TH Köln - University of Applied Sciences, Cologne, Germany
  Thesis: Design and Realization of an Experimental Optical Stop-Motion Capture System
  Reviewers: Stefan Grünvogel, Dietmar Kunz

Academic & Industrial Appointments

- **Postdoctoral Research Associate** — since Sept. 2016
  School of Informatics, Computing, and Engineering, Indiana University
  Supervisors: David Crandall, Chen Yu, Linda B. Smith
- **Research Assistant** — June 2013 - July 2016
  School of Informatics, Computing, and Engineering,
  Department of Psychological and Brain Sciences, Indiana University
- **Associate Instructor (Teaching Assistant)** — Sept. 2011 - May 2013
  School of Informatics, Computing, and Engineering, Indiana University
- Industrial appointments in Germany:
  - Self-employed media engineer (with almö GmbH) — Jan. 2011 - July 2011
  - Intern and student assistant at nexum AG — June 2008 - Nov. 2010
    agency for digital media; worked as web developer
  - Intern at meta-fusion GmbH — May 2009 - Aug. 2009

webcast provider; worked as part of the production staff and the R&D team

Peer-reviewed Publications

- Sven Bambach, Zehua Zhang, David J. Crandall, and Chen Yu. Exploring Inter-Observer Differences in First-Person Object Views using Deep Learning Models. In *Mutual Benefits of Cognitive and Computer Vision Workshop, IEEE International Conference on Computer Vision (ICCV)*, 2017.
- Sven Bambach, David J. Crandall, Linda B. Smith, and Chen Yu. An Egocentric Perspective on Active Vision and Visual Object Learning in Toddlers. In *IEEE International Conference on Development and Learning*, 2017. (Oral, 37% acceptance rate)
- Sven Bambach, David J. Crandall, Linda B. Smith, and Chen Yu. Active viewing in toddlers facilitates visual object learning: An egocentric vision approach. In *Annual Conference of the Cognitive Science Society (CogSci)*, 2016. (Oral, 34% acceptance rate)
- Sven Bambach, Linda B. Smith, David J. Crandall, and Chen Yu. Objects in the center: how the infant's body constrains infant scenes. In *IEEE International Conference on Development and Learning*, 2016. (Oral, 34% acpt. rate) – **Distinguished oral presentation award winner**
- Sven Bambach, Stefan Lee, David J. Crandall, and Chen Yu. Lending a hand: Detecting hands and recognizing activities in complex egocentric interactions. In *IEEE International Conference on Computer Vision (ICCV)*, 2015. (30% acceptance rate)
- Sven Bambach, David J. Crandall, and Chen Yu. Viewpoint integration for hand-based recognition of social interactions from a first-person view. In *17th ACM International Conference on Multimodal Interaction (ICMI)*, 2015. (41% acceptance rate)
- Stefan Lee, Sven Bambach, David J. Crandall, John M. Franchak, and Chen Yu. This hand is my hand: A probabilistic approach to hand disambiguation in egocentric video. In *Workshop on Egocentric Vision, IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2014. – **Intel best paper award winner**
- Sven Bambach, John M. Franchak, David J. Crandall, and Chen Yu. Detecting hands in children's egocentric views to understand embodied attention during social interaction. In *Annual Conference of the Cognitive Science Society, (CogSci)*, 2014. (Oral, 41% acceptance rate)
- Sven Bambach, David J. Crandall, and Chen Yu. Understanding embodied visual attention in child-parent interaction. In *IEEE International Conference on Development and Learning*, 2013. (Oral, 33% acceptance rate).

Teaching Experience

- **Instructor of Record** Fall 2016
  - CSCI B551 *Elements of Artificial Intelligence*, online course (Lead-instructor) (included designing and recording interactive video lectures)
  - CSCI B551 *Elements of Artificial Intelligence*, residential course (Co-instructor) (graduate level course, included giving lectures to a class of ~100 students)
- **Teaching Assistant** (IU calls it Associate Instructor) Sept. 2011 - May 2013
  - Spring 2013: CSCI C211 *Introduction to Computer Science* with Francisco Lara Dammer (included designing and teaching labs)
  - Fall 2012: CSCI C211 *Introduction to Computer Science* with Suzanne Menzel and Prof. Sabry (included designing and teaching labs)
  - Spring 2012: CSCI A321 *Computing Tools for Scientific Research* with Prof. Bramley
  - Fall 2011: CSCI P573 *Scientific Computing* with Prof. Bramley
- Feedback from students:

- C211 instructor evaluations, $n = 36$ students, 0 (strongly disagree) to 4 (strongly agree)
  Overall, I would rate this instructor as outstanding: 3.78
  My instructor developed a good rapport with the class: 3.81
  My instructor is fair and impartial when dealing with students: 3.78

- Teaching statement: https://goo.gl/1BgHw6

Talks & Presentations

- **Paper Presentations at Conferences and Workshops**
  - IEEE International Conference und Development and Learning and Epigenetic Robotics, Lisbon, Portugal — Sep. 2017
  - Annual Conference of the Cognitive Science Society, Philadelphia, PA — Aug. 2016
  - Annual Conference of the Cognitive Science Society, Quebec City, Canada — July 2014
  - IEEE International Conference und Development and Learning and Epigenetic Robotics, Osaka, Japan — Aug. 2013
- **Invited Talks**
  - Special Lecture Series on Machine Learning at NSWC, Crane, IN — Nov. 2017
  - Midwest Computer Vision Workshop, Chicago, IL — May 2017
  - Midwest Computer Vision Workshop, Chicago, IL — Dec. 2014
- **Talks at internal Seminars and Colloquia**
  - IU Intelligent & Interactive Systems Talk Series, Bloomington, IN — Oct. 2017
  - IU Cognitive Lunch Talk Series, Bloomington, IN — Oct. 2014

Abstracts in Conferences & Workshops

- Sven Bambach, David Crandall, Linda Smith, Chen Yu. Active Vision: Learning Visual Objects through Egocentric Views of Children and Parents. In *1st Workshop on Action and Anticipation for Visual Learning, ECCV*, 2016.
- Sven Bambach, Stefan Lee, David Crandall, Chen Yu. Detecting and Segmenting Hands to Recognize Social Interactions in Egocentric Video. In *1st International Workshop on Egocentric Perception, Interaction and Computing, ECCV*, 2016.
- Sven Bambach, Stefan Lee, David Crandall, and Chen Yu. Analyzing hands to recognize social interactions with a large-scale egocentric hands dataset. In *Workshop on Observing and Understanding Hands in Action, IEEE CVPR*, 2016.
- Sven Bambach, Stefan Lee, David Crandall, and Chen Yu. Detecting and classifying hands in social and driving contexts. In *Vision for Intelligent Vehicles and Applications (VIVA) Challenge and Workshop, IEEE Intelligent Vehicles Symposium*, 2015.
- Sven Bambach, Stefan Lee, David Crandall, John Franchak, and Chen Yu. Tracking hands of interacting people in egocentric video. In *Workshop on Observing and Understanding Hands in Action, IEEE CVPR*, 2015.
- Linda B. Smith, Chen Yu, Sven Bambach, and David Crandall. Watching is not the same as doing. In *International Conference on Infant Studies*, 2014.

Awards

- **Fellowships**
  - Paul Purdom Fellowship Award for Doctoral Studies in Informatics/CS — 2015/2016
- **Research Awards**
  - IEEE ICDL-EPIROB Distinguished Oral Presentation Award — Sept. 2016

- 1st place in hand detection/classification at the *Vision for Intelligent Vehicles and Applications (VIVA)* challenge (IEEE IV 2015) June 2015
- *Intel* best paper award at the EgoVision Workshop (IEEE CVPR) June 2014
- Best poster, IU SOIC OpenHouse on Intelligent and Interactive Systems (IIS) Apr. 2014

- **Travel Awards and Grants**
  - NSF-sponsored 2016 travel award for young scientists to attend CogSci 2016
  - Purdue University C Design Lab and NSF-sponsored travel award to attend CVPR 2016
  - IU SOIC Ph.D. student travel grant to attend CVPR 2013 and ICDL 2013
- **Undergraduate Awards**, TH Köln - University of Applied Sciences
  - Award for best GPA among all 2010 graduates at the IMP institute Nov. 2010

Service

- **Reviewing for Conferences**
  - IEEE Conference on Computer Vision and Pattern Recognition (CVPR) 2017, 2018
  - IEEE International Conference on Computer Vision (ICCV) 2017
  - IEEE Conference on Development and Learning and Epigenetic Robotics (ICDL-EpiRob) 2017
- **Reviewing for Journals (ongoing)**
  - Elsevier Journal of Visual Image Communication & Representation, since 2017
  - IEEE Transactions on Multimedia, since 2017

References

- **David J. Crandall**
  Associate Professor of Informatics and Computing
  School of Informatics, Computing, and Engineering | Indiana University
  (812) 856-1115 | djcran@indiana.edu | https://www.cs.indiana.edu/~djcran/
- **Chen Yu**
  Professor of Psychological and Brain Sciences, Cognitive Science and Informatics
  Department of Psychological and Brain Sciences | Indiana University
  (812) 856-0838 | chenyu@indiana.edu | http://psych.indiana.edu/faculty/chenyu.php
- **Linda B. Smith**
  Distinguished Professor and Chancellor's Professor of Psychological and Brain Sciences
  Department of Psychological and Brain Sciences | Indiana University
  (812) 855-6052 | smith4@indiana.edu | http://psych.indiana.edu/faculty/smith4.php
- **Stefan Lee**
  Research Scientist II
  School of Interactive Computing | Georgia Tech
  steflee@gatech.edu | https://www.cc.gatech.edu/~slee3191/

Work Authorization

I am a German citizen with a green card (United States lawful permanent residency), meaning I am authorized to live and work in the United States of America permanently.