KATE SAENKO

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Research Interests: adaptive machine learning, learning for vision and language understanding

EDUCATION

University of British Columbia, Vancouver, Canada	Computer Science	B.Sc., 2000
Massachusetts Institute of Technology, Cambridge, USA	EECS	M.Sc., 2004
Massachusetts Institute of Technology, Cambridge, USA	EECS	Ph.D., 2009

ACADEMIC APPOINTMENTS

Boston University	Associate Professor	2017-
Boston University	Assistant Professor	2016-2017
University of Massachusetts, Lowell	Assistant Professor	2012-2016
Harvard University, SEAS	Associate in Computer Science	2012-2016
UC Berkeley EECS	Visiting Scholar	2009-2012
International Computer Sciences Institute	Postdoctoral Researcher	2009-2012
Harvard University, SEAS	Postdoctoral Fellow	2009-2012
MIT CSAIL	Graduate Research Assistant	2002-2009
MIT EECS	Graduate Teaching Assistant	2007
University of British Columbia	Undergraduate Research Assistant	1998

GRANTS

Total funding as PI: $4,150,000

- **NSF:** *S&AS: FND: COLLAB: Learning Manipulation Skills Using Deep Reinforcement Learning with Domain Transfer,* PI at Boston University, 2017-2020, Award Amount: 300,000.
- **IARPA:** *Deep Intermodal Video Analytics (DIVA),* PI at Boston University, 2017-2021, Award Amount: $1,200,000.
- **DARPA:** *Deeply Explainable Artificial Intelligence,* PI at Boston University, 2017-2021, Award Amount: $800,000.
- **Israeli DoD:** *Generating Natural Language Descriptions for Video Using Deep Neural Networks*, PI at Boston University, 2017-2018, Award Amount: $120,000.
- **NSF:** *CI-New: COVE – Computer Vision Exchange for Data, Annotations and Tools*. PI at UML: 2016-2019; $205,000
- **DARPA:** *Natural Language Video Description using Deep Recurrent Neural Networks,* PI at UML, 2016, Award Amount: $75,000.
- **Google Research Award:** *Natural Language Video Description using Deep Recurrent Neural Networks*, PI at UML, 2015, Award Amount: $23,500.
- **NGA:** *Adaptive Neural Networks for Geospatial Image Analysis*, PI at UML, Sep 2015, Award Amount: $209,000.
- **AFRL:** *Efficient Large-Scale CNN-enabled Semantic Segmentation of Videos*, PI at UML, Start Date: May 2015, Award Amount: $100,000.
- **NSF:** *AitF: FULL: Collaborative Research: PEARL: Perceptual Adaptive Representation Learning in the Wild*; PI at UML, Start Date: 09/2015; $200,000.
- **NSF:** *REU Site: HCISec - Enhancing Undergraduate Research in Modern Human Computer Interaction Security and Privacy*; Award Number: 1461060; PI:Xinwen Fu; Co-PI:Kate Saenko, UML; Start Date:06/01/2015; $249,677.

- **NSF:** *EAGER: Quantifying and Reducing Data Bias in Object Detection Using Physics-based Image Synthesis*; PI at UML. Start Date: 09/01/2014; $185,875.
- **NSF:** *CI-New: Collaborative Research: Federated Data Set Infrastructure for Recognition Problems in Computer Vision*. PI at UML: 2014-2015; $60,000.
- **NSF:** *RI: Large: Collaborative Research: Reconstructive Recognition: Advancing computer vision by uniting statistical scene understanding and physics-based visual reasoning*, PI at UML. 2012-17; $400,000.
- **DARPA:** *Mind's Eye: Recognizing Activities with Probabilistically Grounded Visual Intelligence Models,* as Co-PI at ICSI: 2010-13; $200,000/yr. PI at UML: 2012-14; $277,000.
- **Toyota Corp.:** *Visual Object Recognition for Practical Assistance Robots*, Co-PI at ICSI, Berkeley; 2010-12; $250,000/yr.

TEACHING

- **CS591 Deep Learning,** Instructor   BU CS, 2017
  Co-developing and co-teaching a new advanced grad/ugrad machine learning course. The course covers topics in deep learning/neural networks through lectures, programming assignments and a final project. Enrollment: 60 students.

- **Data Science Option for Computer Science B.Sc.**   UML CS, 2015-2016
  Proposed and implemented a new program of study, the Data Science Option. The option allows Computer Science majors to gain the additional knowledge necessary to become a data scientist, and consists of 4 required and 2 elective courses.

- **COMP 4230, COMP 5320 Computer Vision I,** Instructor   UML CS, 2012-2015
  Developed and taught a new grad/ugrad course. The course covers introductory topics in computer vision and image processing through lectures, programming assignments and a final project.

- **COMP 4540, COMP 5450 Machine Learning**, Instructor   UML CS, 2013-2016
  Developed and taught a new grad/ugrad course in Machine Learning. The course offers an introduction to the subject through lectures, programming assignments, in-class quizzes, exams and a final project.

- **Science Club for Girls**, Volunteer Mentor Scientist   Cambridge, MA, 2010
  Led a once-per-week after-school club for 5th grade girls in Cambridge public school, along with two other mentor scientists. Planned and conducted hand-on rocket science experiments to encourage the girls' interest in science careers.

- **Intelligent Multimodal Interfaces**, Graduate Teaching Assistant   MIT EECS, 2007
  Helped develop a new multi-disciplinary graduate course on Intelligent Multimodal Interfaces. Created and graded assignments, prepared and gave guest lectures.

SELECTED AWARDS

- **Most Innovative Solution Prize,** ActivityNet Challenge, Int. Conf. on Computer Vision   2017
- **Honorable Mention Prize,** TASK-CV Workshop: Transferring and Adapting Source
  Knowledge in Computer Vision, at the European Conf. on Computer Vision   2016
- **Teaching Excellence Award,** UMass Lowell Computer Science Department   2015
- **Best Paper Prize,** TASK-CV Workshop: Transferring and Adapting Source
  Knowledge in Computer Vision, at the International Conf. on Computer Vision   2015

- **Best Paper Prize,** Domain Adaptation Workshop: Theory and Application, NIPS — 2011
- **Mentor Award,** Science Club for Girls, Cambridge, MA — 2010
- **Best Student Paper Award**, International Conference on Multimodal Interfaces — 2006
- **Postgraduate Scholarship**, Canadian Natural Sciences and Engineering Research Council — 2000
- **Canadian Premier's Award for Young Women in Science** — 1999
- **Honorable Mention in the CRA's Outstanding Undergraduate Award** — 1998

INDUSTRY EXPERIENCE

- **Mitsubishi Electric Research Laboratories (MERL)** **Cambridge, MA**
  Research Intern (May 2005 – Aug 2005)
  Research advised by Prof. Candy Sidner investigating human-robot engagement for hosting activities. Implemented algorithms for face detection and tracking on a mobile robot.

- **Advanced Telecommunications Research Intl.** **Kyoto, Japan**
  Student Researcher (Jun 1998 – Dec 1998)
  Conducted research in the area of speech synthesis. Improved speech databases for a concatenative speech synthesis system (CHATR).

- **Redback Networks, Inc.** **San Jose, CA**
  Software Developer, SmartEdge 800 (Jul 2000 – Aug 2002)
  Designed and implemented network protocols, system infrastructure, and software redundancy features in an embedded programming environment using C for NetBSD and VxWorks.

- **Motorola Inc.** **Richmond, BC**
  Software Developer (May 1999 – Aug 1999)
  Developed test tools and designed test cases for GPRS wireless network protocol software in a team environment.

- **Newbridge Networks Corporation** **Burnaby, BC**
  Software Engineer (Jan 1997 – Aug 1997)
  Designed, wrote and packaged software using Object Oriented design techniques in C++. Researched the latest in network security technology. Produced a security model for a distributed object system based on CORBA.

PROFESSIONAL ACTIVITIES

- Program Chair: CVPR 2020
- Area Chair: ICCV 2015, CVPR 2016, ICCV 2017, ICML 2017
- Publications Chair, CVPR 2016
- Demos and Exhibits Chair, CVPR 2015
- Co-organizer of the tutorial at CVPR 2012 on Domain Transfer Learning for Vision Applications
- Co-organizer of workshops:
  - 4th TASK-CV Workshop on transfer learning and domain adaptation, ICCV 2017;
  - 2017 New England Machine Learning Day;
  - 2016 New England Computer Vision Workshop (NECV) at Boston University;
  - Transfer and Multitask Learning Workshop at NIPS 2015;
  - 1st TASK-CV Workshop on transfer learning and domain adaptation, ECCV 2014;
  - Workshop on Visual Domain Adaptation (VisDA), ICCV 2013;

- o [Workshop on Integrating Language and Vision](#), at NIPS, 2011;
- o 6th [Workshop for Women in Machine Learning](#), at NIPS, 2010;
- o Johns Hopkins 2006 Summer Workshop on articulatory feature-based speech recognition ([final report](#))
- Co-editor: 2016 IJCV Special Issue on Language and Vision, co-eds. Meg Mitchell and John Platt
- Reviewer for conferences: CVPR, ECCV, ICCV, NIPS, ICRA
- Reviewer for journals: *Transactions on Pattern Analysis and Machine Intelligence (TPAMI), IEEE International Journal of Computer Vision (IJCV), Journal of Machine Learning Research (JMLR), IEEE Transactions on Multimedia*

OUTREACH ACTIVITIES

- *You Code Girl!* Summer camp, Lowell Public Schools, July 2016
- Volunteer mentor for [Science Club for Girls](#) in Cambridge, MA

COLLABORATORS and ADVISEES

- **Collaborators and Co-Editors**: Trevor Darrell (UC Berkeley), Bill Freeman (MIT), Mario Fritz (Max-Planck-Institut für Informatik), Brian Kulis (OSU), Daphne Koller (Stanford), Fei-Fei Li (Stanford), Jitendra Malik (Berkeley), Raymond Mooney (UT Austin), Marshall Tappen (UCF), Tinne Tuytelaars (K.U.Leuven), Todd Zickler (Harvard)
- **Graduate and Postdoctoral Sponsors**: Trevor Darrell (UCB/ICSI), PhD advisor, Jim Glass (MIT), MS advisor, Todd Zickler (Harvard), postdoc advisor
- **Thesis Advisor**: Baochen Sun *(UML PhD 2016)*; Brigit Schroeder *(UML MSc 2014)*, Vasili Ramanishka, Huijuan Xu, XingChao Peng, Ben Usman *(BU PhD students)*; Judy Hoffman *(Berkeley PhD 2016 co-advised)*; Ronghang Hu *(Berkeley PhD student co-advised)*;
- **Thesis Committee**: Subhashini Venugopalan *(UT Austin PhD advisor Prof. Ray Mooney);* Fatih Cakir *(BU PhD)*
- **Postgraduate-Scholar Advisor**: Dr. Karim Ali *(UML postdoc 2012-2014)*; Dr. Abir Das *(UML/BU postdoc 2015-)*

INVITED TALKS

- [Domain Adaptation for Perception and Action](#) at the [NIPS 2016 workshop on Machine Learning for Intelligent Transportation Systems](#), December 6 2016
- [Adaptive Deep Learning for Vision and Language.](#), MIT CSAIL colloquium, March 15 2016
- Invited lecture at the [Microsoft Machine Learning and Intelligence School](#), (slides: [part1](#), [part2](#)) St Petersburg, Russia, summer 2015

PUBLICATIONS

Google Scholar profile
http://scholar.google.com/citations?user=9xDADY4AAAAJ

Refereed Journal, Conference and Workshop Articles

Hu, R., Rohrbach, M., Andreas, J., Darrell, T., **Saenko, K.,** "Modeling Relationships in Referential Expressions with Compositional Modular Networks". In: *Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition (CVPR)* (2017).

Ramanishka, V., Das, A., Zhang, J., **Saenko, K.,** "Top-down Visual Saliency Guided by Captions". In:

Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition (CVPR) (2017).

Tzeng, E., Hoffman, J., **Saenko, K.**, Darrell, T., "Adversarial discriminative domain adaptation". In: *Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition (CVPR)* (2017).

Venugopalan, S., Hendricks, L. A., Rohrbach, M., Mooney, R., Darrell, T., **Saenko, K.,** "Captioning images with diverse objects". In: *Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition (CVPR)* (2017).

Anne Hendricks, L., Venugopalan, S., Rohrbach, M., Mooney, R., **Saenko, K.**, Darrell, T., "Deep Compositional Captioning: Describing Novel Object Categories Without Paired Training Data". In: *Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition (CVPR).* 2016, pp. 1–10.

Gualtieri, M., Pas, A. t., **Saenko, K.**, Platt, R., "High precision grasp pose detection in dense clutter". In: *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS).* 2016.

Hoffman, J., Pathak, D., Tzeng, E., Long, J., Guadarrama, S., Darrell, T., **Saenko, K.,** "Large scale visual recognition through adaptation using joint representation and multiple instance learning". In: *Journal of Machine Learning Research* 17.142 (2016), pp. 1–31.

Hu, R., Xu, H., Rohrbach, M., Feng, J., **Saenko, K.**, Darrell, T., "Natural language object retrieval". In: *Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition.* 2016, pp. 4555– 4564.

"Vision and Language Integration Meets Multimedia Fusion: Proceedings of ACM Multimedia 2016 Workshop". In: *Proceedings of the 2016 ACM on Multimedia Conference.* Ed. by Marie-Francine Moens, Katerina Pastra, Kate Saenko, and Tinne Tuytelaars. ACM. 2016, pp. 1493–1493.

Peng, X., Hoffman, J., Stella, X. Y., **Saenko, K.,** "Fine-to-coarse knowledge transfer for low-res image classification". In: *Image Processing (ICIP), 2016 IEEE International Conference on.* IEEE. 2016, pp. 3683– 3687.

Peng, X., **Saenko, K.,** "Combining Texture and Shape Cues for Object Recognition With Minimal Supervision". In: *ACCV* (2016). url: http://arxiv.org/abs/1609.04356.

Ramanishka, V., Das, A., Park, D. H., Venugopalan, S., Hendricks, L. A., Rohrbach, M., **Saenko, K.,** "Multimodal Video Description". In: *Proceedings of the 2016 ACM on Multimedia Conference.* ACM. 2016, pp. 1092–1096.

Sun, B., Feng, J., **Saenko, K.,** "Return of Frustratingly Easy Domain Adaptation". In: *AAAI.* 2016.

Sun, B., **Saenko, K.,** "Deep coral: Correlation alignment for deep domain adaptation". In: *Computer Vision– ECCV 2016 Workshops.* Springer International Publishing. 2016, pp. 443–450.

Tzeng, E., Devin, C., Hoffman, J., Finn, C., Abbeel, P., Levine, S., **Saenko, K.**, Darrell, T., "Adapting deep visuomotor representations with weak pairwise constraints". In: *Workshop on the Algorithmic Foundations of Robotics (WAFR).* 2016.

Venugopalan, S., Hendricks, L. A., Mooney, R., **Saenko, K.,** "Improving lstm-based video description with linguistic knowledge mined from text". In: *EMNLP.* 2016.

Xu, H., **Saenko, K.,** "Ask, Attend and Answer: Exploring Question-Guided Spatial Attention for Visual Question Answering". In: *European Conference on Computer Vision (ECCV).* 2016.

Darrell, T., **Saenko, K.**, Hoffman, J., "Dagstuhl Summary Paper". In: *Machine Learning with Inter- dependent and Non-identically Distributed Data (Dagstuhl Seminar 15152)* (2015).

Donahue, J., Hendricks, L. A., Guadarrama, S., Rohrbach, M., Venugopalan, S., **Saenko, K.**, Darrell, T., "Long-term recurrent convolutional networks for visual recognition and description". In: *CVPR* (2015).

Guadarrama, S., Rodner, E., **Saenko, K.**, Darrell, T., "Understanding object descriptions in robotics by open-vocabulary object retrieval and detection". In: *The International Journal of Robotics Research* (2015).

Hoffman, J., Pathak, D., Darrell, T., **Saenko, K.,** "Detector Discovery in the Wild: Joint Multiple Instance and Representation Learning". In: *CVPR* (2015).

Mrowca, D., Rohrbach, M., Hoffman, J., Hu, R., **Saenko, K.**, Darrell, T., "Spatial Semantic Regu- larisation for Large Scale Object Detection". In: *Proceedings of the IEEE International Conference on Computer Vision.* 2015, pp. 2003– 2011.

Peng, X., Sun, B., Ali, K., **Saenko, K.,** "Learning Deep Object Detectors From 3D Models". In:

Proceedings of the IEEE International Conference on Computer Vision. 2015, pp. 1278–1286.

Peng, X., Sun, B., Ali, K., **Saenko, K.,** "What Do Deep CNNs Learn About Objects?" In: *Interna- tional Conference on Representation Learning (ICLR) Workshop Track* (2015).

Sun, B., Peng, X., **Saenko, K.,** "Generating Large Scale Image Datasets from 3D CAD Models". In: *CVPR 2015 Workshop on The Future of Datasets in Vision* (2015).

Sun, B., **Saenko, K.,** *Subspace Distribution Alignment for Unsupervised Domain Adaptation.* Vol. 2. British Machine Vision Conference, 2015.

Tzeng, E., Hoffman, J., Darrell, T., **Saenko, K.,** "Simultaneous deep transfer across domains and tasks". In: *Proceedings of the IEEE International Conference on Computer Vision.* 2015, pp. 4068– 4076.

Venugopalan, S., Rohrbach, M., Donahue, J., Mooney, R., Darrell, T., **Saenko, K.,** "Sequence to Sequence Video to Text". In: *ICCV* (2015).

Venugopalan, S., Xu, H., Donahue, J., Rohrbach, M., Mooney, R., **Saenko, K.,** "Translating videos to natural language using deep recurrent neural networks". In: *HLT NAACL* (2015).

Xu, H., Venugopalan, S., Ramanishka, V., Rohrbach, M., **Saenko, K.,** "A Multi-scale Multiple In- stance Video Description Network". In: *ICCV 2015 Workshop on Closing the Loop between Vision and Language* (2015).

Ali, K., **Saenko, K.,** "Confidence-rated multiple instance boosting for object detection". In: *Computer Vision and Pattern Recognition (CVPR), 2014 IEEE Conference on.* IEEE. 2014, pp. 2433–2440.

Chakrabarti, A., Xiong, Y., Sun, B., Darrell, T., Scharstein, D., Zickler, T., **Saenko, K.,** "Model- ing Radiometric Uncertainty for Vision with Tone-Mapped Color Images". In: *Pattern Analysis and Machine Intelligence, IEEE Transactions on* 36.11 (2014), pp. 2185–2198.

Goehring, D., Hoffman, J., Rodner, E., **Saenko, K.,** Darrell, T., "Interactive adaptation of real-time object detectors". In: *Robotics and Automation (ICRA), 2014 IEEE International Conference on.* IEEE. 2014, pp. 1282–1289.

Guadarrama, S., Rodner, E., **Saenko, K.,** Zhang, N., Farrell, R., Donahue, J., Darrell, T., "Open- vocabulary object retrieval". In: *Robotics: Science and Systems* (2014).

Hoffman, J., Darrell, T., **Saenko, K.,** "Continuous manifold based adaptation for evolving visual domains". In: *Computer Vision and Pattern Recognition (CVPR), 2014 IEEE Conference on.* IEEE. 2014, pp. 867–874.

Hoffman, J., Guadarrama, S., Tzeng, E. S., Hu, R., Donahue, J., Girshick, R., Darrell, T., **Saenko, K.,** "LSDA: Large scale detection through adaptation". In: *Advances in Neural Information Processing Systems.* 2014, pp. 3536–3544

Hoffman, J., Guadarrama, S., Tzeng, E., Donahue, J., Girshick, R., Darrell, T., **Saenko, K.,** *From large-scale object classifiers to large-scale object detectors: An adaptation approach.* NIPS, 2014.

Hoffman, J., Rodner, E., Donahue, J., Kulis, B., **Saenko, K.,** "Asymmetric and Category Invariant Feature Transformations for Domain Adaptation". In: *International Journal of Computer Vision* 109.1- 2 (2014), pp. 28–41.

Schroeder, B., Sun, B., **Saenko, K.,** Ali, K., *Deconstructing the Deformable Parts Model: Do More with Less.* 2014.

Sun, B., **Saenko, K.,** "From virtual to reality: Fast adaptation of virtual object detectors to real domains". In: *Proceedings of the British Machine Vision Conference. BMVA Press* (2014).

Thomason, J., Venugopalan, S., Guadarrama, S., **Saenko, K.,** Mooney, R., "Integrating language and vision to generate natural language descriptions of videos in the wild". In: *Proceedings of the 25th International Conference on Computational Linguistics (COLING), August* (2014).

Donahue, J., Hoffman, J., Rodner, E., **Saenko, K.,** Darrell, T., "Semi-supervised domain adapta- tion with instance constraints". In: *Computer Vision and Pattern Recognition (CVPR), 2013 IEEE Conference on.* IEEE. 2013, pp. 668–675.

Guadarrama, S., Krishnamoorthy, N., Malkarnenkar, G., Venugopalan, S., Mooney, R., Darrell, T., **Saenko, K.,** "Youtube2text: Recognizing and describing arbitrary activities using semantic hierarchies and zero-shot recognition". In: *Computer Vision (ICCV), 2013 IEEE International Conference on.* IEEE. 2013, pp. 2712–2719.

Huang, K., Ding, X., Chen, G., **Saenko, K.,** "Automatic mobile photo tagging using context". In: *TENCON 2013-2013 IEEE Region 10 Conference (31194).* IEEE. 2013, pp. 1–5.

Janoch, A., Karayev, S., Jia, Y., Barron, J. T., Fritz, M., **Saenko, K.,** Darrell, T., "A category-level 3d object dataset: Putting the kinect to work". In: *Consumer Depth Cameras for Computer Vision.* Springer London, 2013, pp. 141–165.

Krishnamoorthy, N., Malkarnenkar, G., Mooney, R., **Saenko, K.**, Guadarrama, S., "Generating natural-language video descriptions using text-mined knowledge". In: *NAACL HLT 2013* (2013), p. 10.

McCann, E., Medvedev, M., Brooks, D. J., **Saenko, K.,** "Off the grid: Self-contained landmarks for improved indoor probabilistic localization". In: *Technologies for Practical Robot Applications (TePRA), 2013 IEEE International Conference on*. IEEE. 2013, pp. 1–6.

Hoffman, J., Kulis, B., Darrell, T., **Saenko, K.,** "Discovering latent domains for multisource domain adaptation". In: *Computer Vision–ECCV 2012*. Springer Berlin Heidelberg, 2012, pp. 702–715.

Packer, B., **Saenko, K.**, Koller, D., "A combined pose, object, and feature model for action under- standing." In: *CVPR*. 2012, pp. 1378–1385.

Xiong, Y., **Saenko, K.**, Darrell, T., Zickler, T., "From pixels to physics: Probabilistic color de- rendering". In: *Computer Vision and Pattern Recognition (CVPR), 2012 IEEE Conference on*. IEEE. 2012, pp. 358–365.

Hoffman, J., **Saenko, K.**, Kulis, B., Darrell, T., "Domain adaptation with multiple latent domains". In: *NIPS Domain Adaptation Workshop* (2011).

Kulis, B., **Saenko, K.**, Darrell, T., "What you saw is not what you get: Domain adaptation using asymmetric kernel transforms". In: *Computer Vision and Pattern Recognition (CVPR), 2011 IEEE Conference on*. IEEE. 2011, pp. 1785–1792.

Owens, T., **Saenko, K.**, Chakrabarti, A., Xiong, Y., Zickler, T., Darrell, T., "Learning object color models from multi-view constraints". In: *Computer Vision and Pattern Recognition (CVPR), 2011 IEEE Conference on*. IEEE. 2011, pp. 169–176.

Saenko, K., Karayev, S., Jia, Y., Shyr, A., Janoch, A., Long, J., Fritz, M., Darrell, T., "Practical 3-d object detection using category and instance-level appearance models". In: *Intelligent Robots and Systems (IROS), 2011 IEEE/RSJ International Conference on*. IEEE. 2011, pp. 793–800.

Tuytelaars, T., Fritz, M., **Saenko, K.**, Darrell, T., "The NBNN kernel". In: *Computer Vision (ICCV), 2011 IEEE International Conference on*. IEEE. 2011, pp. 1824–1831.

Fritz, M., **Saenko, K.**, Darrell, T., "Size matters: Metric visual search constraints from monocular metadata". In: *Advances in Neural Information Processing Systems*. 2010, pp. 622–630.

Saenko, K., Kulis, B., Fritz, M., Darrell, T., "Adapting visual category models to new domains". In: *Computer Vision–ECCV 2010*. Springer Berlin Heidelberg, 2010, pp. 213–226.

Saenko, K., Darrell, T., "Filtering abstract senses from image search results". In: *Advances in Neural Information Processing Systems*. 2009, pp. 1589–1597.

Saenko, K., Darrell, T., "Unsupervised learning of visual sense models for polysemous words". In: *Advances in Neural Information Processing Systems*. 2009, pp. 1393–1400.

Saenko, K., Livescu, K., Glass, J., Darrell, T., "Multistream articulatory feature-based models for visual speech recognition". In: *Pattern Analysis and Machine Intelligence, IEEE Transactions on* 31.9 (2009), pp. 1700–1707.

Saenko, K., Darrell, T., "Object category recognition using probabilistic fusion of speech and image classifiers". In: *Machine Learning for Multimodal Interaction*. Springer Berlin Heidelberg, 2008, pp. 36–47.

Hasegawa-Johnson, M., Livescu, K., Lal, P., **Saenko, K.,** "Audiovisual speech recognition with artic- ulator positions as hidden variables". In: *Proc. International Congress of Phonetic Sciences (ICPhS)* (2007).

Livescu, K., Cetin, O., Hasegawa-Johnson, M., King, S., Bartels, C., Borges, N., Kantor, A., Lal, P., Yung, L., Bezman, A., "Articulatory feature-based methods for acoustic and audio-visual speech recognition: 2006 JHU summer workshop final report (Tech. Rep. No. WS06)". In: *Johns Hopkins University Center for Language and Speech Processing* (2007).

Livescu, K., Cetin, O., Hasegawa-Johnson, M., King, S., Bartels, C., Borges, N., Kantor, A., Lal, P., Yung, L., Bezman, A., "Articulatory feature-based methods for acoustic and audio-visual speech recog- nition: Summary from the 2006 JHU summer workshop". In: *Acoustics, Speech and Signal Processing, 2007. ICASSP 2007. IEEE International Conference on*. Vol. 4. IEEE. 2007, pp. IV–621.

Saenko, K., Darrell, T., "Towards adaptive object recognition for situated human-computer interac- tion". In: *Proceedings of the 2007 workshop on Multimodal interfaces in semantic interaction*. ACM. 2007, pp. 43–46.

Christoudias, C. M., **Saenko, K.**, Morency, L.-P., Darrell, T., "Co-adaptation of audio-visual speech and gesture classifiers". In: *Proceedings of the 8th international conference on Multimodal interfaces*. ACM. 2006, pp. 84–91.

Saenko, K., Livescu, K., "An asynchronous DBN for audio-visual speech recognition". In: *Spoken Language*

Technology Workshop, 2006. IEEE. IEEE. 2006, pp. 154–157.

Saenko, K., Livescu, K., Glass, J., Darrell, T., "Production domain modeling of pronunciation for vi- sual speech recognition". In: *Acoustics, Speech, and Signal Processing, 2005. Proceedings.(ICASSP'05). IEEE International Conference on.* Vol. 5. IEEE. 2005, pp. v–473.

Saenko, K., Livescu, K., Siracusa, M., Wilson, K., Glass, J., Darrell, T., "Visual speech recognition with loosely synchronized feature streams". In: *Computer Vision, 2005. ICCV 2005. Tenth IEEE International Conference on.* Vol. 2. IEEE. 2005, pp. 1424–1431.

Hazen, T. J., **Saenko, K.**, La, C.-H., Glass, J. R., "A segment-based audio-visual speech recognizer: Data collection, development, and initial experiments". In: *Proceedings of the 6th International Con- ference on Multimodal Interfaces (ICMI).* ACM. 2004, pp. 235–242.

Saenko, K., Darrell, T., Glass, J. R., "Articulatory features for robust visual speech recognition". In: *Proceedings of the 6th international conference on Multimodal interfaces.* ACM. 2004, pp. 152–158.