SERGE BELONGIE

Cornell Tech   sjb344@cornell.edu
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New York, NY 10044   (607) 527-0749

Education

UNIVERSITY OF CALIFORNIA, BERKELEY   Berkeley, CA
Ph.D. in Electrical Engineering and Computer Sciences, 2000.
M.S. in Electrical Engineering and Computer Sciences, 1997.
Dissertation: *Image Segmentation and Shape Matching for Object Recognition*
Advisor: Jitendra Malik.

CALIFORNIA INSTITUTE OF TECHNOLOGY   Pasadena, CA
B.S. in Electrical Engineering with Honor, 1995

Appointments

CORNELL TECH   New York, NY
July 2019-present
Associate Dean

CORNELL UNIVERSITY & CORNELL TECH   Ithaca & New York, NY
January 2014-present
Andrew H. and Ann R. Tisch Professor (2020-present), Professor (2014-2020),
Department of Computer Science

GOOGLE, INC.   New York, NY
May 2018-present
Visiting Faculty

TECHNICAL UNIVERSITY OF DENMARK   Copenhagen, DK
February 2018-present
Honorary Professor

CALIFORNIA INSTITUTE OF TECHNOLOGY   Pasadena, CA
July-September 2013
Visiting Associate in Electrical Engineering

CORNELL TECH   New York, NY
January-June 2013
Visiting Professor

ANCHOVI LABS   San Diego, CA
November 2011-September 2012
Co-founder and Technical Advisor. Acquired by Dropbox, Inc.

UNIVERSITY OF CALIFORNIA, SAN DIEGO   La Jolla, CA
July 2001-December 2013
Professor (2011-2013), Associate Professor (2007-present), Assistant Professor
(2001-2007), Department of Computer Science and Engineering

ORPIX, INC.   Huntington Beach, CA
April 2009-Present
Co-founder and Technical Advisor

CALIFORNIA INSTITUTE OF TECHNOLOGY   Pasadena, CA
April-December 2008
Visiting Associate in Electrical Engineering

CARCODE CORPORATION   Del Mar, CA
March 2007-January 2009
Co-founder and Technical Advisor. Acquired by Transport Data Systems

DIGITAL PERSONA, INC.   Redwood City, CA
June 1993-April 2014
Co-founder and Chief Researcher. Acquired by Crossmatch, Inc.

CALIFORNIA INSTITUTE OF TECHNOLOGY   Pasadena, CA
Summer 1993 & 1994
Summer Undergraduate Research Fellow (SURF), Department of Electrical Engineering

CORNELL UNIVERSITY   Ithaca, NY
June-September 1992
NSF REU Research Assistant, Department of Electrical Engineering

Teaching

CORNELL UNIVERSITY   New York, NY
CS 5785, Applied Machine Learning, Spring 2013-2014, Fall 2015-2019
CS 6670, *Computer Vision*, Spring 2015
CS 5356, *Building Startup Systems*, Fall 2014

UNIVERSITY OF CALIFORNIA, SAN DIEGO   La Jolla, CA
CSE 252, *Computer Vision*, Spring 2002-2003
CSE 155, *Projects in Vision & Learning*, Winter 2006-2012
CSE 166, *Image Processing*, Winter 2002, Fall 2002-2013
CSE 252C, *Topics in Vision & Learning*, Fall 2001-2012
CSE 252B, *Computer Vision II*, Spring 2004-2012
COGS 87, *Seminar: Computation, Vision & Cognition in Film*, Winter 2006
ENG 100L, *Teams in Engineering Service*, Winter 2007-Fall 2011

UNIVERSIDADE ESTADUAL DE CAMPINAS (UNICAMP)   Campinas, Brazil
Short Course on Grouping and Recognition, Summer 2005

UNIVERSITY OF CALIFORNIA, BERKELEY   Berkeley, CA
CS 188, *Introduction to Artificial Intelligence*, Fall 1998: Grad Student Instructor

CALIFORNIA INSTITUTE OF TECHNOLOGY   Pasadena, CA
EE 32ab, *Signals and Systems*, 1994-1995: Teaching Assistant
EE 1, *Introduction to Electrical Engineering*, 1995: Teaching Assistant

Selected Honors

Cornell Tech Student Choice Award, 2018-2019.
Cornell Tech Professor of the Year, 2015-2016.
Helmholtz Prize (ICCV Test of Time), 2015.
WACV Best Paper Award in Vision & Learning, 2015.
HCOMP Best Paper Runner Up, 2015.
ASRM Video Presentation Award Honorable Mention, 2014.
NIPS Best Student Paper Honorable Mention, 2010.
Marr Prize (ICCV Best Paper) Honorable Mention, 2007.
DARPA Computer Science Futures participant, 2007.
NAE Frontiers of Engineering participant, 2005.
Alfred P. Sloan Research Fellow, 2005-2007.
NSF CAREER Award, 2005-2010.
MIT Technology Review Innovator Under the Age of 35, 2004.
T-Sector Magazine's Ten Top Talents for the Future of San Diego Technology, 2003.
NSF Graduate Research Fellowship, 1996-1999.
U.C. Berkeley Chancellor's Opportunity Predoctoral Fellowship, 1995-1998.
Caltech Merit Award, 1994-1995.
NSF Incentives for Excellence Scholarship Prize, 1994.
Carl and Shirley Larson SURF Fellow, 1993 & 1994.
NSF Research Experiences for Undergraduates (REU) Program, 1992.
Robert J. Kieckhefer, Jr. Memorial Scholarship, 1992 & 1993.
Intel Outstanding Senior Scholarship, 1991.

Professional Activities

Co-founder and President: Common Visual Data Foundation (CVDF), 2016 - Present.

Co-organizer, LDV Vision Summit, 2014 - Present.

Co-organizer: Workshop on Fine Grained Visual Categorization (FGVC), 2011, 2013, 2015, 2017, 2018, 2019, 2020; Workshop on Computer Vision for AR/VR (CV4ARVR), 2019, 2020; Workshop on Detecting Objects in Aerial Images (DOAI), 2019; ICDAR2017 Robust Reading Challenge on COCO-Text, 2017.

Program Chair: IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2012; CVPR Workshop on Visual Scene Understanding, 2009; NIPS Workshop on Human Computation for Science and Computational Sustainability, 2012; ACCV Workshop on Detection and Tracking in Challenging Environments, 2012; CVPR Workshop on Frontiers in Computer Vision: Outreach & Core, 2012.

General Chair: IEEE Workshop on Applications of Computer Vision (WACV), 2014.

Area Chair: Conference on Computer Vision and Pattern Recognition (CVPR), 2006, 2007, 2011, 2015, 2016, 2019; International Conference on Computer Vision (ICCV), 2013; European Conference on Computer Vision (ECCV), 2010, 2018; Asian Conference on Computer Vision (ACCV), 2012; Neural Information Processing Systems (NIPS), 2013.

PAMI TC Conference Committee, 2013-present.

Paper Awards Committee: CVPR, 2014.

Tutorials/Short Courses Chair: IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2010.

Local Arrangements Chair: IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2005.

Associate Editor: IEEE Trans. Pattern Analysis and Machine Intelligence (TPAMI), 2008-2012.

Guest Editor: Special Issue on Fine-Grained Visual Categorization, IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI), 2019; Special Issue on Active and Interactive Methods in Computer Vision, International Journal of Computer Vision (IJCV), 2014.

Steering Committee: Workshop on Human Computation for Image and Video Analysis (GroupSight), 2016, 2017.

Award Committee, European Conference on Computer Vision (ECCV), 2012.

Senior Program Committee: AAAI Conference on Human Computation and Crowdsourcing (HCOMP), 2016.

Program Committee: European Conference on Computer Vision (ECCV), 2002, 2004; IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2003, 2004; IEEE International Conference on Computer Vision (ICCV), 2003; IEEE International Workshop on Dynamical Vision, 2005; Workshop on Computer Vision Applications for the Visually Impaired, 2008, 2010, 2012; Workshop on Automating Computer Vision with Humans in the Loop, 2010; Workshop on Human Computation, 2009-2012; IEEE Workshop on Motion and Video Computing, 2009; Workshop on Energy Minimization Methods for Computer Vision and Pattern Recognition, 2006; Neural Information Processing Systems (NIPS), 2006; Workshop on Semantic Learning Applications of Multimedia, 2007; Workshop on Human Computer Interaction, 2009; Workshop on Component Analysis for Computer Vision, 2009; ICCV Workshop on 3D Representation and Recognition, 2011; ICCV Workshop on Human Interaction in Computer Vision, 2011; ECCV/CVPR Workshop on Visual Analysis and Geo-Localization of Large-Scale

Imagery, 2012 & 2013; ECCV Workshop on Re-Identification, 2012; CVPR Scene Understanding Workshop, 2013; CVPR Workshop on Visual Analysis Beyond Semantics, 2013; International Workshop on Robust Reading (IWRR), 2016, 2018; Workshop on Web-scale Vision and Social Media (VSM) at ECCV, 2016; Workshop on Egocentric (First-Person) Vision at CVPR, 2016; Workshop on Automated Analysis of Video Data for Wildlife Surveillance at WACV, 2016; Workshop on Visual Wildlife Monitoring, 2017; Workshop on Automated Analysis of Marine Video for Environmental Monitoring, 2018.

Reviewer: IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI), IEEE Transactions on Image Processing, IEEE Conference on Computer Vision and Pattern Recognition (CVPR), IEEE International Conference on Computer Vision (ICCV), European Conference on Computer Vision (ECCV), Neural Information Processing Systems (NIPS), Journal of Image and Vision Computing (IVC), Journal of Machine Learning Research (JMLR), ACM Transactions on Graphics (TOG), SIGGRAPH.

CVPR Doctoral Consortium Panel, 2010, 2014, 2016, 2017, 2018.

NSF Panels: Robotics and Human Augmentation (RHA), 2002; Small Business Innovation Research (SBIR), 2002; Computer Vision CAREER, 2010.

ArtFoo Chair, 2017-2018.

Contributor to Revealing Bodies exhibit, Exploratorium, San Francisco, 2000.

Invited Seminars

CVPR workshop on Large Scale Computer Vision for Remote Sensing Imagery (EarthVision), "A New Workflow for Collaborative Machine Learning Research in Biodiversity," June 2020.

The Metropolitan Museum of Art - Tech Salon "Advancing Connections to Art with Open Access and AI", Feb. 2020.

"From Visipedia to PointAR," University of Copenhagen, Machine Learning Seminar, Dec. 2019; NYU Music & Audio Research Laboratory, Nov. 2018; U. Pennsylvania, Oct. 2018; Intel Research San Diego, Jun. 2018; Technical University of Denmark (DTU), May 2018; AT&T Labs NYC, Jul. 2017.

Visioncamp Fireside Chat, Betaworks, Jan. 2018.

Roosevelt Island Community Conversations, Cornell Tech, Sep. 2018.

Cornell Tech After Hours Alumni Dinner, Sep. 2017.

"Fine Grained Visual Category Recognition and Perceptual Embedding," Temple University CIS Department, Oct. 2017 (distinguished lecture); New York R conference,

Apr. 2017 (keynote); Global Biodiversity Information Facility (GBIF), Feb. 2017; Warby Parker, Oct. 2016; Binghamton University, Sep. 2016 (distinguished lecture); Google Tech Talk, Jul. 2016; Oxford University, Jul. 2016; Tompkins County Area Development (TCAD) Annual Meeting, May 2016 (keynote); Winter Conference on Applications of Computer Vision (WACV), Jan. 2016 (keynote).

"COCO-Text: Overview & What's Next," International Workshop on Robust Reading at ECCV, Oct. 2016 (keynote).

"Visipedia Tool Ecosystem for Dataset Curation and Annotation," CVPR Workshop on Computer Vision and Human Computation, June 2014; ECCV Workshop on Parts and Attributes, September 2014; NYC Computer Vision Meetup, December 2014; Technical University of Denmark (DTU), June 2015; Yahoo Labs NYC, December 2015.

"The Visipedia Field Guide to North American Birds," ECCV Workshop on Computer Vision for the Web, Oct. 2012; Brown University, Feb. 2014; Stony Brook University, May 2014; NRC Workshop on Automating Image and Video Analysis for Fisheries Stock Assessment, May 2014.

"Visual Recognition with Humans in the Loop," NYU & Columbia, Mar. 2010; ENS Paris, INRIA Grenoble, Oxford University, Jun. 2010; Microsoft Research New England & MIT CSAIL, Jul. 2010; UT Austin, Feb. 2011; MPI-CBG Dresden, May 2011; Willow Garage & MPI Tubingen, Jun. 2011; Simula Research Lab (U. Oslo), Jul. 2011; MBL Woods Hole, Oct. 2011; Claremont Graduate University, Feb. 2012; Google LAX, U. Pennsylvania and CMU, Mar. 2012; SoCal Vision Meetup, May 2012; U. Zaragoza & Google NYC, June 2012; Fudan University & Xi'an Jiaotong University, July 2012; Cornell University, Aug. 2012; Seoul National University and KAIST, Sept. 2012; NYC Machine Learning Meetup, Nov. 2012; SRI Princeton, Mar. 2013; Cornell CS Colloquium, Apr. 2013; eBay Research Labs Distinguished Lecture, May 2013; U. Maryland HCIL Symposium, May 2013; Facebook, May 2013; Greater New York Multimedia and Vision Meeting Keynote, June 2013; ISVC Keynote, July 2013; University College London, August 2013.

"Assistive Vision Technology for the Blind: Recognizing Objects in the Grocery Store," Harvey Mudd College, Oct. 2006; Google Mountain View, Sep. 2006; UC Riverside, April 2007; California State Summer School for Mathematics and Science (COSMOS) hosted at SPAWAR, July 2007; Monrovia High School, Dec. 2008.

"Visipedia: Visual Systems Composed of People and Machines," International Computer Vision Summer School, 2013.

"Shape Matching," International Computer Vision Summer School, 2007.

"Toward a Perceptual Space for Reflectance," Caltech March 2006, UCLA April 2006, Microsoft Research (Redmond), July 2006; U. Washington July 2006; UBC, July 2006.

"Beyond Pairwise Clustering," U.C. Irvine, March 2005; Johns Hopkins University, May

2005; Instituto de Matemática Pura e Aplicada (IMPA), Rio de Janeiro, July 2005; U.v. Amsterdam, August 2005; TU Delft, August 2005; University of São Paulo, São Carlos, August 2005; Columbia University, September 2005.

"Behavior Recognition via Spatio-Temporal Features," LLNL, Nov. 2004.

"Monitoring Animal Behavior in the Smart Vivarium," UCLA, Sept. 2004; Caltech, Nov. 2004.

"Methods for Shape Matching and Motion Segmentation," Max Planck Institute, Tübingen, Germany, May 2004.

"Smart Vivarium for Medical Research," UCSD Jacobs School Research Review Keynote Lecture, Feb. 2004.

"Three Brown Mice: See How They Run: Monitoring Rodent Behavior in the Smart Vivarium," Naval Research Laboratory, Washington DC, Nov. 2003; LLNL, Jan. 2004; Columbia University, Feb. 2004; New York University, Feb. 2004.

"Shape Matching and Image Segmentation," UC Irvine, Feb. 2002, LLNL, June 2002.

"Matching Shapes," UCSD, Feb. 2001; UC Santa Cruz, Mar. 2001; Michigan State University, Mar. 2001; UCLA, Apr. 2001.

"The Normalized Cuts Approach to Grouping," Caltech, Mar. 1998.

"Recognizing Spoken Words from Lip Movement," Linköping University, Sweden, June 1995.

Grants

Fine Grained Analysis of Images and Video for Understanding User Intent, Facebook Research Award, 2018-2021, $1.77M, PI.

Mixed Reality for Tele-Assistance, Magic Leap, 2018-2019, $200k, PI.

eBay Research Award, 2018, $80k, PI.

Adobe Research Award: Adobe Systems Incorporated Award, 2016-2017, $25k, PI.

Focused Research Award: Visipedia, Google, 2016-2018, $1.5M, co-PI.

COCO-Text Dataset, Facebook Research Award, 2016, $50k, PI.

Amazon Web Services Research Award, 2015, $10k, PI.

MS-COCO Annotation, Microsoft Research, 2015, $35k, PI.

Binocular Vision: Computer-Enabled Optics to Identify Birds, Jacobs Institute, 2014-2016, $25k, co-PI.

Common Objects in Context Dataset, Microsoft Research, 2014, $25k, PI.

Focused Research Award: Never Failing Goggles, Google, 2013-2015, $1.5M, co-PI.

Active Illumination Based Structure Recovery and Material Recognition, Cognex, 2012-2013, $100k, co-PI.

Videotext Detection and Recognition, Samsung, 2012-2013, $100k, PI.

Expert Huddles for Distributed Image Annotation, Qualcomm, 2012, $28,750, PI.

OCR in the Wild, Google Research Award, 2011-12, $70k, PI.

AWS in Education Grant, Amazon, 2011-2013, $7,500 (PI).

Computer Vision Coral Ecology: Cyber-Enabled Image Classification for Rapid, Large Scale, Automated Monitoring of Climate Change Impacts on Coral Reefs, NSF, 2009-2012, $1,999,440, co-PI.

YouTube Video Genre Classification, Google Research Award, 2009-2010, $65,000.

MURI: Remote Multi-modal Biometrics for Maritime Domain, ONR, 2008-2013, $1,275,000, Co-PI.

Computer Science Futures II: Engaging Young Scholars in Computer Science, DARPA, 2008-2011, $286k, PI.

Segmentation-Based Recognition: Incorporating Shape into a Parts-Based Model, Google Research Award, 2007-2008, $75,000.

Vision-based Object Detection/Recognition for Mobile Robots, SPAWAR, 2006, $36,000.

NSF Research Experience for Undergraduates (REU) supplement, 2006-2007, $12,000.

CAREER: Algorithms for Nonrigid Structure from Motion, NSF, 2005-10, $400k, PI.

A Regularization Based Approach to Non-Rigid Structure from Motion, DOE, 2004-2005, $30,000.

Multiple Animal Tracking in the Smart Vivarium, DOE, 2004, $30,500.

Feature-Based Approaches for Long-Range Motion Segmentation and Object Tracking, DOE, 2003-2004, $40,121.

IGERT: Vision and Learning in Humans and Machines, NSF, 2003-2008, $3,400,000 (senior personnel).

Automated Tissue Microarray Analysis, Hellman Fellowship Program, 2003-2004, $20,000.

Computationally Efficient Example-Based Image Segmentation, DOE, 2002-2003, $39,494.

Journal Articles

Thapa, Ranjita; Zhang, Kai; Snavely, Noah; Belongie, Serge Belongie; Khan, Awais, "The Plant Pathology 2020 challenge dataset to classify foliar disease of apples," *Applications in Plant Sciences*, to appear.

Little, Damon; Tulig, Melissa; Tan, Kiat Chuan; Liu, Yulong; Belongie, Serge; Kaeser‑Chen, Christine; Michelangeli, Fabián; Panesar, Kiran; Guha, RV; Ambrose, Barbara, "An algorithm competition for automatic species identification from herbarium specimens," *Applications in Plant Sciences*, **8**(6), 2020.

Li, Xuhong; Grandvalet, Yves; Davoine, Franck; Cheng, Jingchun; Cui, Yin; Zhang, Yang; Belongie, Serge; Tsai, Yi-Hsuan; Yang, Ming-Hsuan, "Transfer Learning in Computer Vision Tasks: Remember Where You Come From," *Image and Vision Computing*, **93**(103853), 2020.

Veit, Andreas; Belongie, Serge "Convolutional Networks with Adaptive Inference Graphs," *International Journal of Computer Vision* (IJCV), 2019.

Poursaeed, Omid; Matera, Tomáš; Belongie, Serge, "Vision-based Real Estate Price Estimation," *Machine Vision and Applications*, **29**(4), 2018.

Yang, Longqi; Hsieh, Cheng-Kang; Yang, Hongjian; Pollak, John; Dell, Nicola; Belongie, Serge; Cole, Curtis; Estrin, Deborah, "Yum-Me: A Personalized Nutrient-Based Meal Recommender System," *ACM Transactions on Information Systems (TOIS)*, **36** (1), 2017.

B.A. Levine, J. Feinstein, Q.V. Neri, D. Goldschlag, Z. Rosenwaks, S. Belongie and G.D. Palermo, "Three-dimensional sperm surface reconstruction: a novel approach to assessing sperm morphology," *Fertility and Sterility,* **104**(6), e14-e15, 2015.

S. Belongie and P. Perona, "Visipedia circa 2015," *Pattern Recognition Letters*, December 2015.

P. Dollár, R. Appel, S. Belongie and P. Perona, "Fast Feature Pyramids for Object Detection," *IEEE Transactions on Pattern Analysis and Machine Intelligence*, 2014.

D. Lluncor, S. Belongie, P. Rullan and V. Morhenn, "Regression and classification

methods for nasolabial folds," *Journal of Dermatology*, **41**(1), pp. 92-7, 2014.

C. Barngrover, R. Kastner and S. Belongie, "Semisynthetic Versus Real-World Sonar Training Data for the Classification of Mine-Like Objects," *IEEE Journal of Oceanic Engineering*, 2014.

S. Branson, G. Van Horn, C. Wah, P. Perona and S. Belongie, "The Ignorant Led by the Blind: A Hybrid Human–Machine Vision System for Fine-Grained Categorization," *International Journal of Computer Vision (IJCV)*, 2014.

B. Babenko, M. Yang and S. Belongie, "Visual Tracking with Online Multiple Instance Learning," *IEEE Trans. Pattern Analysis and Machine Intelligence (TPAMI)*, **33**(8):1619-1632, August 2011.

C. Galleguillos and S. Belongie, "Context Based Object Categorization: A Critical Survey," Computer Vision and Image Understanding (CVIU), vol. 114, pp. 712-722, 2010.

M. Chandraker, S. Agarwal, D. Kriegman and S. Belongie, "Globally Optimal Algorithms for Stratified Autocalibration," *International Journal of Computer Vision (IJCV)*, **90**(2):236-254, November 2010.

J. Wills, S. Agarwal, D. Kriegman and S. Belongie, "Toward a perceptual space for reflectance," *ACM Transactions on Graphics (TOG)*, **28**(4):1-15, 2009

M. Koch, J. Maltz, S. Belongie, B. Gangadharan, S. Bose and A. Bani-Hashemi, "Automatic coregistration of volumetric images based on implanted fiducial markers," *Medical Physics*, **35**(10):4513-23, October 2008.

F. Kahl, S. Agarwal, M. Chandraker, D. Kriegman and S. Belongie, "Practical Global Optimization for Multiview Geometry," *International Journal of Computer Vision (IJCV)*, **79**(3):271-284, September 2008.

J. Wills, S. Agarwal and S. Belongie, "A Feature-based Approach for Dense Segmentation and Estimation of Large Disparity Motion," *International Journal of Computer Vision (IJCV)*, **68**(2):125-143, June 2006.

A. Rabinovich, S. Krajewski, M. Krajewska, A. Shabaik, S.M. Hewitt, S. Belongie, J.C. Reed, J.H. Price, "Automated Scanning and Display of Tissue Microarrays," *IEEE Trans. Information Technology in Biomedicine*, **10**(12):209-219, April 2006.

G. Mori, S. Belongie and J. Malik, "Efficient Shape Matching Using Shape Contexts," *IEEE Trans. Pattern Analysis and Machine Intelligence (TPAMI)*, **27**(11):1832-1837, November 2005.

C. Fowlkes, S. Belongie, F. Chung and J. Malik, "Spectral Grouping Using the Nyström Method," *IEEE Trans. Pattern Analysis and Machine Intelligence (TPAMI)*, **26**(2):214 - 225, Feb. 2004.

J. Carballido Gamio, S. Belongie and S. Majumdar, "Normalized Cuts in 3D for Spinal MRI Segmentation," *IEEE Trans. Medical Imaging*, **23**(1):36-44, January 2004.

S. Agarwal, R. Ramamoorthi, S. Belongie and H.W. Jensen, "Structured Importance Sampling of Environment Maps," *ACM Transactions on Graphics - Proceedings of SIGGRAPH*, **22**(3):605-612, July 2003.

S. Belongie, J. Malik, and J. Puzicha, "Shape Matching and Object Recognition Using Shape Contexts," *IEEE Trans. Pattern Analysis and Machine Intelligence (TPAMI)*, **24**(4):509-522, April 2002.

C. Carson, S. Belongie, H. Greenspan, and J. Malik, "Color- and Texture-Based Image Segmentation Using Expectation-Maximization and Its Application to Image Querying and Classification," *IEEE Trans. Pattern Analysis and Machine Intelligence (TPAMI)*, **24**(8), Aug. 2002.

J. Malik, S. Belongie, T. Leung, and J. Shi, "Contour and Texture Analysis for Image Segmentation," *International Journal of Computer Vision (IJCV)*, **43**(1):7-27, June 2001.

Papers in Reviewed Proceedings

Jia, Menglin; Shi, Mengyun; Sirotenko, Mikhail; Cui, Yin; Hariharan, Bharath; Cardie, Claire; Adam, Hartwig; Belongie, Serge, "Fashionpedia: Ontology, Segmentation, and an Attribute Localization Dataset," *European Conference on Computer Vision (ECCV)*, Glasgow, Scotland, 2020,

Cai, Ruojin; Yang, Guandao; Averbuch-Elor, Hadar; Hao, Zekun; Belongie, Serge; Snavely, Noah; Hariharan, Bharath, "Learning Gradient Fields for Shape Generation," *European Conference on Computer Vision (ECCV)*, Glasgow, Scotland, 2020.

Kevin Musgrave Serge Belongie, Ser-Nam Lim, "A Metric Learning Reality Check," *European Conference on Computer Vision (ECCV)*, Glasgow, Scotland, 2020.

Lou, Aaron; Katsman, Isay; Jiang, Qingxuan; Belongie, Serge; Lim, Ser-Nam; De Sa, Christopher, "Differentiating through the Fréchet Mean," *International Conference on Machine Learning (ICML)*, Vienna, 2020.

Thapa, Ranjita; Snavely, Noah; Belongie, Serge; Khan, Awais, "The FGVC Plant Pathology 2020 challenge dataset to classify foliar diseases of apples," *CVPR Workshop on Fine-Grained Visual Categorization (FGVC)*, Seattle, WA, 2020.

Qian, Rui; Garg, Divyansh; Wang, Yan; You, Yurong; Belongie, Serge; Hariharan, Bharath; Campbell, Mark; Weinberger, Kilian; Chao, Wei-Lun, "End-to-end Pseudo-LiDAR for Image-Based 3D Object Detection," *Computer Vision and Pattern Recognition (CVPR)*, Seattle, WA, 2020.

Hao, Zekun; Averbuch-Elor, Hadar; Snavely, Noah; Belongie, Serge, "DualSDF: Semantic Shape Manipulation using a Two-Level Representation," *Computer Vision and Pattern Recognition (CVPR)*, Seattle, WA, 2020.

Skovsen, Søren; Haraldsson, Harald; Davis, Abe; Karstoft, Henrik; Belongie, Serge, "Decoupled Localization and Sensing with HMD-based AR for Interactive Scene Acquisition," *CVPR Workshop on Computer Vision for Augmented and Virtual Reality (CV4ARVR)*, Seattle, WA, 2020.

Haraldsson, Harald; Skovsen, Søren; Lim, Ser-Nam; Marschner, Steve; Belongie, Serge; Davis, Abe, "Head-mounted AR for Guided Surface Reflectance Capture," *CVPR Workshop on Computer Vision for Augmented and Virtual Reality (CV4ARVR)*, Seattle, WA, 2020.

Poursaeed, Omid; Kim, Vladimir; Shechtman, Eli; Saito, Jun; Belongie, Serge, "Neural Puppet: Generative Layered Cartoon Characters," *Winter Conference on Applications of Computer Vision (WACV)*, 2020.

Li, Boyi; Wu, Felix; Weinberger, Kilian; Belongie, Serge, "Positional Normalization," *Neural Information Processing Systems (NeurIPS)*, Vancouver, 2019.

Forbes, Maxwell; Kaeser-Chen, Christine; Sharma, Piyush; Belongie, Serge, "Neural Naturalist: Generating Fine-Grained Image Comparisons," *Conference on Empirical Methods in Natural Language Processing (EMNLP)*, Hong Kong, 2019

Guo, Sheng; Huang, Weilin; Zhang, Xiao; Srikhanta, Prasanna; Cui, Yin; Li, Yuan; Scott, Matthew; Adam, Hartwig; Belongie, Serge, "The iMaterialist Fashion Attribute Dataset," *ICCV Workshop on Computer Vision for Fashion, Art, and Design (CVFAD)*, Seoul, Korea, 2019. **Best Paper Award**

Yang, Guandao; Huang, Xun; Hao, Zekun; Liu, Ming-Yu; Belongie, Serge; Hariharan, Bharath, "PointFlow: 3D Point Cloud Generation with Continuous Normalizing Flows," *International Conference on Computer Vision (ICCV)*, Seoul, Korea, 2019.

Huang, Qian; Katsman, Isay; He, Horace; Gu, Zeqi; Belongie, Serge; Lim, Ser-Nam, "Enhancing Adversarial Example Transferability with an Intermediate Level Attack," *International Conference on Computer Vision (ICCV)*, Seoul, Korea, 2019.

Robertson, Tim; Belongie, Serge; Adam, Hartwig; Kaeser-Chen, Christine; Zhang, henyang; Tan, Kiat Chuan; Liu, Yulong; Brulé, Denis; Deltheil, Cédric; Loarie, Scott; Van Horn, Grant; Mac Aodha, Oisin; Beery, Sara; Perona, Pietro; Copas, Kyle; Waller, John Thomas, "Training Machines to Identify Species using GBIF-mediated Datasets," *Biodiversity Information Science and Standards (TDWG)*, Leiden, NL, 2019.

Kaeser-Chen, Christine; Birch, Tanya; Chou, Katherine; Gadot, Tomer; Adam, Hartwig; Belongie, Serge; Robertson, Tim; Fegraus, Eric; Morris, Dan, "Towards Ethical Deployment of AI for Conservation Systems," *KDD Workshop Data Mining and AI for*

Conservation (DMAIC), Anchorage, AK, 2019.

Kaur, Parneet; Sikka, Karan; Wang, Weijun; Belongie, Serge; Divakaran, Ajay, "FoodX-251: A Dataset for Fine-grained Food Classification," *CVPR Workshop on Fine-Grained Visual Categorization (FGVC)*, Long Beach, CA, 2019

Cui, Yin; Jia, Menglin; Lin, Tsung-Yi; Song, Yang; Belongie, Serge, "Class-Balanced Loss Based on Effective Number of Samples," *Computer Vision and Pattern Recognition (CVPR)*, Long Beach, CA, 2019.

Yang, Guandao; Malisiewicz, Tomasz; Belongie, Serge, "Learning Data-Adaptive Interest Points through Epipolar Adaptation," *Computer Vision and Pattern Recognition Workshops (CVPRW 2019)*, 2019.

Zhang, Chenyang; Kaeser-Chen, Christine; Vesom, Grace; Choi, Jennie; Kessler, Maria; Belongie, Serge, "The iMet Collection 2019 Challenge Dataset," *CVPR Workshop on Fine-Grained Visual Categorization (FGVC)*, Long Beach, CA, 2019

Sun, Ran; Haraldsson, Harald; Zhao, Yuhang; Belongie, Serge, "Anon-Emoji: An Optical See-Through Augmented Reality System for Reducing Appearance Bias in Social Interactions," *CVPR Workshop on Computer Vision for Augmented and Virtual Reality (CV4ARVR)*, Long Beach, CA, 2019.

Jensen, Janus Nørtoft; Hannemose, Morten; Wilm, Jakob; Dahl, Anders Bjorholm; Frisvad, Jeppe Revall; Belongie, Serge, "Generating Spatial Attention Cues via Illusory Motion," *CVPR Workshop on Computer Vision for Augmented and Virtual Reality (CV4ARVR)*, Long Beach, CA, 2019.

Tseng, Po Yen; Haraldsson, Harald; Belongie, Serge, "Annotate All! A Perspective Preserved Asynchronous Annotation System for Collaborative Augmented Reality," *CVPR Workshop on Computer Vision for Augmented and Virtual Reality (CV4ARVR)*, Long Beach, CA, 2019.

Tan, Kiat Chuan; Liu, Yulong; Ambrose, Barbara; Tulig, Melissa; Belongie, Serge, "The Herbarium Challenge 2019 Dataset," *CVPR Workshop on Fine-Grained Visual Categorization (FGVC)*, Long Beach, CA, 2019.

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Shi, Baoguang; Bai, Xiang; Belongie, Serge, "Detecting Oriented Text in Natural Images by Linking Segments," *Computer Vision and Pattern Recognition (CVPR)*, Honolulu, HI,

2017.

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Yang, Longqi; Cui, Yin; Zhang, Fan; Pollak, John; Belongie, Serge; Estrin, Deborah, "PlateClick: Bootstrapping Food Preferences Through an Adaptive Visual Interface," *International Conference on Information and Knowledge Management (CIKM 2015)* , Melbourne, 2015.

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Wah, Catherine; Maji, Subhransu; Belongie, Serge, "Learning Localized Perceptual Similarity Metrics for Interactive Categorization," *IEEE Winter Conference on Applications of Computer Vision (WACV)*, Waikoloa Beach, HI, 2015. **Best Paper Award for Vision & Learning Session**

Moghimi, Mohammad; Kerr, Jacqueline; Johnson, Eileen; Godbole, Suneeta; Belongie, Serge, "Discriminative Regions: A Substrate for Analyzing Life-logging Image Sequences," *MultiMedia Modelling (MMM)*, Sydney, Australia, 2015.

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Lluncor, David; Belongie, Serge; Rullan, Peter; Morhenn, Vera, "Regression and classification methods for nasolabial folds," *Journal of Dermatology*, 41 (1), pp. 92-7, 2014.

Tripathi, Subarna; Hwang, Youngbae; Belongie, Serge; Nguyen, Truong, "Improving Streaming Video Segmentation with Early and Mid-Level Visual Processing," *Winter Conference on Applications of Computer Vision (WACV)*, Steamboat Springs, CO, 2014.

Barngrover, Christopher; Kastner, Ryan; Belongie, Serge, "Semisynthetic Versus Real-World Sonar Training Data for the Classification of Mine-Like Objects," *IEEE Journal of Oceanic Engineering*, 2014.

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Moghimi, Mohammad; Azagra, Pablo; Montesano, Luis; Murillo, Ana; Belongie, Serge, "Experiments on an RGB-D Wearable Vision System for Egocentric Activity Recognition," *CVPR Workshop on Egocentric (First-person) Vision*, Columbus, OH, 2014.

Lin, Tsung-Yi; Maire, Michael; Belongie, Serge; Hays, James; Perona, Pietro; Ramanan, Deva; Dollár, Piotr; Zitnick, Lawrence, "Microsoft COCO: Common Objects in Context," *European Conference on Computer Vision (ECCV)*, Zürich, 2014.

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Matera, Tomas; Jakes, Jan; Cheng, Munan; Belongie, Serge, "A User Friendly Crowdsourcing Task Manager," *Workshop on Computer Vision and Human Computation*, Columbus, OH, 2014.

A. Flores, E. Christiansen, D. Kriegman and S. Belongie, "Camera distance from face images," *International Symposium on Visual Computing (ISVC)*, Crete, July 2013.

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T. Yoshida, K. Kitani, S. Belongie, K. Schlei and H. Koike, "EdgeSonic: Image Feature Sonication for the Visually Impaired," *International Conference on the Augmented Human*, Tokyo, 2011.

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P. Krishnasamy, S. Belongie and D. Kriegman, "Wet Fingerprint Recognition: Challenges and Opportunities," *International Joint Conference on Biometrics (IJCB)*, Washington, DC, October, 2011.

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R. Hewitt and S. Belongie, "Active Learning in Face Recognition: Using Tracking to Build a Face Model," *IEEE Workshop on Vision for Human Computer Interaction*, 2006.

N. Ben-Haim, B. Babenko and S. Belongie, "Improving Web-based Image Search via Content Based Clustering," *International Workshop on Semantic Learning Applications in Multimedia*, 2006.

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