Sean Bell

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Education

Cornell University — Ithaca, NY
M.Sc., Ph.D. in Computer Science — *2011 Sept – 2016 Aug*

- Advisor: Prof. Kavita Bala.
- Committee: Profs. Kavita Bala (chair), Noah Snavely, Charles Van Loan
- Cumulative GPA: 3.98 / 4.30

University of Toronto — Toronto, ON, Canada
B.A.Sc., Engineering Science, with Honors — *2007 – 2011*

- Major in Electrical and Computer Engineering
- Cumulative GPA: 3.93 / 4.00

Experience

GrokStyle Inc. — San Francisco, CA and Ithaca, NY
Chief Executive Officer and Co-Founder — *2015 Sept – Present*

- Built the core visual search and crowdsourcing platform for finding and recognizing products in photos
- Raised $1,760,000 in seed funding from VC and angel investors (convertible equity)
- Awarded $225,000 in non-dilutive funding from NSF (National Science Foundation) as the Principal Investigator, with a SBIR Phase I grant (Small Business Innovation Research)
- Won 1st place in the LDV Vision Summit 2016 Entrepreneurial Computer Vision Challenge

Cornell University — Ithaca, NY
Graduate Research Assistant — *2011 Sept – 2016 Aug*

- New ConvNet architectures for visual search across multiple domains
- Algorithms for material recognition and intrinsic images using deep learning and graphical models
- Extensible open-source crowdsourcing platform (OpenSurfaces)
- Multi-view stereo pipeline to reconstruct both geometry and material properties
- Contact: Kavita Bala / kb@cs.cornell.edu / 607 288 2252

Microsoft Research — Seattle, WA
Research Intern — *2015 Summer*

- Advanced the state-of-the-art in object detection, using deep learning
- Improved detection results by +8.5 mAP over baseline Fast R-CNN on VOC2007
- Contact: Ross Girshick (ross.girshick@gmail.com) and Larry Zitnick (lzitnick@hotmail.com). Note: Ross and Larry are now both at Facebook AI Research.

University of Toronto — Toronto, ON, Canada
Undergraduate Researcher — *2010 Sept – 2011 May*

- Automatically detect noun phrases and find inconsistent references between patent claims
- Interactive patent editor that provides syntax highlighting and highlights errors in real time
- Contact: Gerald Penn (Thesis Supervisor) / 416 978 7390 / gpenn@cs.toronto.edu

Hill & Schumacher Toronto, ON, Canada
Assistant Patent Agent *2007, 2008, 2009, 2010, 2011 Summers*

- Met with inventors, drafted and reviewed provisional and non-provisional patent applications
- Prepared responses for examiner reports and office actions, performed patent searches for patentability and freedom to operate, assessed infringement and validity
- Designed a database and UI to track clients, deadlines, and patent metadata
- Contact: Nancy Hill & Lynn Schumacher (Firm Partners) / 416 368 1097 / h-s@hill-schumacher.com

Publications

Inside-Outside Net: Detecting Objects in Context with Skip Pooling and Recurrent Neural Networks
Sean Bell, Larry Zitnick, Kavita Bala, Ross Girshick. *Computer Vision and Pattern Recognition (CVPR) 2016.*

- State-of-the-art object detection results on PASCAL and COCO, with the best algorithm on the public VOC 2012 leaderboard (as of 1 Dec 2015)
- Won Best Student Entry in Microsoft COCO 2015 Detection Challenge
- New architecture for object detection incorporating skip pooling and recurrent neural networks

Learning Visual Clothing Style with Heterogeneous Dyadic Co-occurrences
Andreas Veit, Balazs Kovacs, Sean Bell, Julian McAuley, Kavita Bala, Serge Belongie. *International Conference on Computer Vision (ICCV) 2015.*

- Predict which clothing items are compatible by training a visual style embedding.
- Available online: http://vision.cornell.edu/se3/projects/clothing-style/

Learning Visual Similarity for Product Design with Convolutional Neural Networks
Sean Bell, Kavita Bala. *ACM Transactions on Graphics (SIGGRAPH 2015).*

- Visual search: proposed new architectures for training visual descriptors for images
- Domain adaptation: developed a crowdsourcing pipeline to collect training data for domain adaptation

Material Recognition in the Wild with the Materials in Context Database
Sean Bell*, Paul Upchurch*, Noah Snavely, Kavita Bala. *Computer Vision and Pattern Recognition (CVPR) 2015. *Equal contribution.*

- Material recognition: full-scene material classification and segmentation using convolutional neural networks (deep learning) and fully-connected conditional random fields
- Dataset: crowdsourced over 2 million material labels in internet photographs with a 3-stage pipeline
- Available online: http://minc.cs.cornell.edu/

Intrinsic Images in the Wild
Sean Bell, Noah Snavely, Kavita Bala. *ACM Transactions on Graphics (SIGGRAPH 2014).*

- Intrinsic images: state-of-the-art algorithm using fully-connected conditional random fields
- Dataset: crowdsourced thousands of images annotated with relative reflectance information, aggregated from millions of responses by modeling each worker's skill and bias
- Benchmark: performance metric for intrinsic images with a focus on real-world images
- Available online: http://intrinsic.cs.cornell.edu/

OpenSurfaces: A Richly Annotated Catalog of Surface Appearance
Sean Bell, Paul Upchurch, Noah Snavely, Kavita Bala. *ACM Transactions on Graphics (SIGGRAPH 2013).*

- Crowdsourcing: implemented a dynamic pipeline of 13 different Mechanical Turk experiments
- Dataset: 100k surfaces annotated with material boundaries, reflectance, material name, surface normal, scene category, and object name
- Available online: http://opensurfaces.cs.cornell.edu/

Other Service

Technical paper reviewer

Computer Vision and Pattern Recognition (CVPR)	2015, 2016
ACM Transactions on Graphics (SIGGRAPH)	2015, 2016
ACM Transactions on Graphics (SIGGRAPH Asia)	2014
ACM User Interface Software and Technology (UIST)	2016
IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI)	2016
IEEE Transactions on Visualization and Computer Graphics (TVCG)	2015

Teaching Assistant

Cornell TA for computer vision (CS4670/5670) — Spring 2015, 2016
Prepared and presented the deep learning lectures, assignments, homework/exam questions

Awards

LDV Vision Summit Entrepreneurial Computer Vision Challenge, 1st place	2016
Microsoft COCO Detection Challenge, Best Student Entry	2015
NSERC Postgraduate Doctoral Scholarship (PGS-D)	2013 – 2016
NSERC Postgraduate Masters Scholarship	2011 – 2012
Constant Temperature Limited Scholarship	2011
Shaw Design Scholarship	2010
AER201 Engineering Design Project, 1st place	2008
University of Toronto Scholar	2008
Hewlett-Packard CodeWars Competition, Advanced Division, 1st place	2005

Skills

Languages: Python/Cython, C/C++, Java, Javascript/Coffeescript, HTML/CSS/LESS, Bash/Zsh
Tools: Caffe, Django, PostgreSQL, Redis, Celery/RabbitMQ, StarCluster, HDF5, NumPy/SciPy, Git
Platforms: Linux/Unix/Ubuntu, Amazon AWS (EC2 & S3)