# PULKIT AGRAWAL

E-mail: pulkitag@csail.mit.edu          Phone: (+1) 412-478-3792          Home Page: http://cs.berkeley.edu/~pulkitag

## EDUCATION

**University of California, Berkeley**                                                         **(**2014-2018)
Ph.D. in Computer Science
Ph.D. Thesis: Computational Sensorimotor Learning

**University of California, Berkeley**                                                          (2011-2014)
M.S in Computer Science

**Indian Institute of Technology, Kanpur**                                               (2007-2011)
Bachelor of Technology in Electrical Engineering
Director's Gold Medal for best all round achievement and leadership in graduating class

## APPOINTMENTS
- Assistant Professor, EECS, MIT (2019-)
- Chief Architect**,** SafelyYou Inc. (2016-19)
- Postdoctoral Researcher, UC Berkeley (2018-19)
- Software Engineer, Dexterity Inc. (2018-19)
- Graduate Student Researcher, UC Berkeley (2011 – 2018)
- Research Intern, DeepMind (July – Oct 2016)
- Consultant, Deep Learning Tech., Cavium Inc. (2015)
- Research Intern, Qualcomm (May – Aug 2013)
- General Secretary, Science & Technology Council, Indian Institute of Technology Kanpur (2010-11)

## PATENTS
**Agrawal P.**, Majumdar S., Invariant object representation in images using spiking neural networks, US Patent 2015/0278641, Oct 2015

**Agrawal P.**, Majumdar S., Gupta V., Invariant object representation in images using spiking neural networks, US Patent 2015/0278628, Oct 2015

## RESEARCH GRANTS
- Co-Investigator, **Defense Advanced Research Projects Agency** (DARPA) MCS Grant ($9M, 2019-23)
- Principal Investigator, **Sony** Faculty Research Award ($129K, 2019-20)

## PUBLICATIONS/PRE-PRINTS

### *Computer Vision*

Felsen P., **Agrawal P.**, Malik J., *What will happen Next? Forecasting Player Moves in Sports Videos,* International Conference on Computer Vision (ICCV) 2017

Zamir A., Wekel T., **Agrawal P.**, Wei C., Malik J., Savarese S., *Generic 3D representations via pose estimation and matching,* European Conference on Computer Vision (ECCV) 2016.

Huh J., **Agrawal P.**, Efros A., *What makes Imagenet good for transfer learning?,* Neural Information Processing Systems Workshop on Large Scale Computer Vision Systems (NIPS Workshop) 2016

Carreira J**., Agrawal P**., Fragkiadaki K., Malik J., *Human Pose Estimation with Iterative Error Feedback,* Computer Vision and Pattern Recognition (CVPR) 2016.

**Agrawal P**., Carreira J., Malik J., *Learning to See by Moving,* International Conference on Computer Vision (ICCV) 2015

**Agrawal P**., Girshick R., Malik J., *Analyzing the performance of multilayer neural networks for object recognition*, European Conference on Computer Vision (ECCV) 2014.

## Robotics & Reinforcement Learning

Shentu Y.*, Chen D.*, Pathak D.*, **Agrawal P.*,** Darrell T., Levine S., Malik J., *Learning Segmentation by Experimentation*, Computer Vision and Pattern Recognition Workshop (CVPR Workshop), 2018

Pathak D.*, Mahmoudieh P*., Luo M.*, **Agrawal P.*,** Shentu Y., Chen D., Shelhamer E., Malik J., Efros A., Darrell, T**.,** *Zero Shot Visual Imitation*, in submission to International Conference Learned Representation (ICLR) 2018. (*Equal Contribution) **(Oral, top 20 papers)**

Pathak D**., Agrawal P**., Efros A., Darrell T., *Curiosity Driven Exploration by Self-Supervised Prediction*, International Conference on Machine Learning (ICML) 2017.

Denil M., **Agrawal P.,** Kulkarni T., Erez T., Battalgia P., Freitas N., Learning to perform physical experiments via deep reinforcement learning, International Conference on Learned Representation (ICLR) 2017.

Nair A.*, Chen D.*, **Agrawal P***., Abbeel P., Malik J., Levine S., *Combining Self-Supervision and Imitation for Vision Based Rope Manipulation*, International Conference on Robotics and Automation (ICRA) 2017. (*Equal contribution)

**Agrawal P***., Nair A.*, Abbeel P., Malik J., Levine S., *Learning to Poke by Poking: Experiential Learning of Intuitive Physics,* Neural Information Processing Systems (NIPS) 2016. (*Equal contribution) **(Oral, top 2% papers)**

Fragkiadaki K.*, **Agrawal P***., Levine S., Malik J., *Learning Visual Predictive Models of Physics for Playing Billiards,* International Conference of Learned Representations (ICLR) 2016. (*Equal contribution)

## Neuroscience / Cognitive Science

Dubey R., **Agrawal P.,** Pathak D., Efros A., Griffiths T., *Investigating Human Priors for Playing Video Games*, International Conference on Machine Learning (ICML) 2018. (**Long Talk**)

**Agrawal P.**, Stansbury D., Malik J., Gallant J., *Pixels to Voxels: Modeling visual representation in the human brain*, arXiv 1407.5104, 2014.

Lescroart M., Agrawal P., Gallant J., *Both convolutional neural networks and voxel-wise encoding models of brain activity derived from ConvNets represent boundary-and surface-related features*, presented in Vision Science Society (VSS) 2016.

*Others*

Cheung B., Terekhov A., Chen Y., **Agrawal P.**, Olshausen B., *Superposition of many models into one*, arXiv 1902.05522, 2019.

Zhang J., Gajjala S., **Agrawal P.**, Tiso G., Hallock L. Beussink-Nelson L., Fan E., Aras M., Jordan C., Fleischmann K., Melisko M., Qasim A., Efros A., Shah S., Bajcsy R., Deo R., *Fully automated echocardiogram interpretation in clinical practice: feasibility and diagnostic accuracy,* Circulation 2018.

Bayen E.*, Jacquemot J.*, Netscher G., **Agrawal P**., Noyce L., Bayen A., *Reduction in Fall Rate in Dementia Managed Care through Video Incident Review: A Pilot Study,* Journal of Medical Internet Research (JMIR) 2017.

Gweon G., **Agrawal P.**, Udani M., Raj B., Rose C., *The automatic assessment of knowledge interaction processes in project teams,* International Conference of Computer Supported Collaborative Learning (CSCL) 2011. **(Best Student Paper Award)**

## INVITED TALKS

o   Learning by Experimentation, Facebook Human and Machine Intelligence Workshop, May 2019
o   Computational Sensorimotor Learning, Computer Science Lecture, University of Toronto, April 2018
o   Computational Sensorimotor Learning, Computer Science Lecture, Stanford University, April 2018
o   Computational Sensorimotor Learning, EECS Special Seminar, MIT, Mar 2018
o   Continually Evolving Machines: Learning by Experimenting, Guest Lecture in Introduction to Deep Learning, Carnegie Mellon University , Nov 1 2017
o   Learning by Experimenting, LIGO Seminar, Caltech, July 27 2017
o   Learning by Experimenting, YConf, San Francisco, June 10 2017
o   Intuitive Physics & Intuitive Behavior, MIT, April 2017
o   Intuitive Physics & Intuitive Behavior, VASC Seninar, Carnegie Mellon University, April 2017
o   Intuitive Physics & Intuitive Behavior, IIT Kanpur, January 2017
o   Intuitive Physics & Intuitive Behavior, Intuitive Physics Workshop at NIPS 2016
o   Learning to Control from Visual Inputs, Guest Lecture, Computer Vision class at UC Berkeley, 2016
o   Learning to Control from Visual Inputs, **Invited Tutorial**, ICVGIP 2016
o   Learning to Control from Visual Inputs, NASSCOM, Bangalore, 2016
o   Learning to Control from Visual Inputs, Oxford University, September 6 2016
o   Learning to forecast and control from visual inputs, Guibas Group Meeting, Stanford University, April 2016
o   Ecologically Relevant Supervision: Insights from Brains and Machines, Google Brain, February 8 2016
o   The Human Visual Hierarchy is Isomorphic to the Hierarchy learned by a Deep Convolutional Neural Network Trained for Object Recognition, Statistical Methods for Understanding Neural Systems Workshop at NIPS 2015
o   Vision, Neural Networks and the Brain, Intel, May 13 2015

o Multillayer Neural Networks Trained on Natural Images Reveal how Visual Features are Represented in the Human Visual Cortex, Carnegie Mellon University, April 2015

## MEDIA COVERAGE

o *Curiosity Driven Exploration by Self-Supervised Prediction,* featured in [MIT Tech Review](), [New Scientist](), [Quanta Magazine](), [Engadget](), [NYPost](), [Futurism](), [Digital Trends](), [Publico](), [India Times]() , [Tech Xplore]() etc.

o *Learning to perform physical experiments via deep reinforcement learning*, featured in [New scientist](), [The Stack]().

o *Learning to Poke by Poking: Experiential Learning of Intuitive Physics,* featured in [MIT Tech Review]()

## TEACHING EXPERIENCE

Graduate Student Instructor, Computer Vision (CS 280; Spring 2015, Spring 2018)

## PROFESSIONAL ACTIVITIES

**Conference Area Chair**: Conference on Robotics Learning (2019)

**Conference Reviewer**: CVPR (2015-2018; **Outstanding Reviewer** 2018), ECCV (2016), ICCV (2015, 2017), NIPS (2016, 2017, 2018, 2019), ICLR (2017, 2019); **Best Review Award**), ICRA (2018, 2019), IROS (2019)

**Jourrnal Reviews**

International Journal of Computer Vision (IJCV), Paper ID: VISI-D-16-00266, Oct 2 2016

International Journal of Robotics Research (IJRR), Paper ID: IJR-16.2771.R1, July 13 2017

IEEE Transactions on Pattern Analysis and Machine Intelligence, Paper ID: TPAMI-2017-08-0531

Computer Vision and Image Understanding

**University**: PhD Admissions Committee (2013, 2014)

**Educational Workshops:** CMU– NITK Surathkal Winter School (2014), Winter Hackathon at IIT Kanpur (2013)

## SELECTED AWARDS

o **Sony Faculty Research Award** 2019

o **Signature Innovation Fellow** 2017-18

o **International Fulbright Science and Technology Award** 2011-14

o **Director's Gold Medal** for best all round achievement and leadership in class of 2011 at IIT Kanpur.

o **Academic Excellence Award** for the *year 2007-08, 2008-09* and *2009-10* IIT Kanpur

o **Sridhar Memorial Prize** for best student in electrical engineering based on academic performance, IIT Kanpur.

o **Smt. Saraswati Singh Scholarship** for best student in Electrical engineering based on GPA at the end of 3$^{rd}$ year., IIT Kanpur

o **Goldman Sachs Global Leadership Award** 2009

o **OP Jindal Engineering and Management Scholar (OPJEMS)** 2009

o First Prize in Electromarket, Digital & Analog circuit design competition in Techkriti-10.

o Runner-up, in Prayog, Experimental Science Competition, Techkriti 09**.**

o Runner-up in Advanced level, embedded circuit design competition Techkriti-08

## STUDENTS MENTORED

Jacob M. Huh, Undergraduate Research, now a PhD student at Carnegie Mellon University

Ashvin Nair, Undergraduate Research, now a PhD student at UC Berkeley

Dian Chen, Undergraduate Research, now a PhD student at UT Austin

Yide (Fred) Shentu, Undergraduate Research, now at Covariant Inc.

Fahad Kamran, Undergraduate Research, graduated from Berkeley in 2018

Jeffrey Zhang, Undergraduate Research, now a Ph.D. student at UIUC

Michael Luo, Undergradaute Research, graduating from Berkeley in 2019

## OUTREACH WORKSHOPS

### *Carnegie Mellon University – NITK Surathkal Winter School, India  (Dec 2014; Link)*

o   Emotion Recognition with *Dhruv Goel, Satish Palaniappan and Skand Arora*

o   Never Ending Learning of Sound with *Aditi Bhatnagar, Amog Hiremath, Ankit Shah, Parnika Nervaskar and Rohan Badlani*

o   What makes image popular on social media with *Chirag Nagpal, Kodali Naveen, Megha Arora, Nimisha Sharath and Rohan Katyal*

o   Voice Forensics with *Priya Soundararajan, Sathkivel S., Tejeswini Sundaram and Utkarsh Patenge*

o   Predicting Crime Rates for Predictive Policing with *Aman Kumar Singh, Lavanya Gupta and Priya Selvan*

o   Generating visual storyboards from text with *Akshay Uttamai, Jay Bothra, Ashwin Kalyan and Harsha Vardhan*

o   Automatic Commentary Generation for Lawn Tennis with *Akshay Varun, Satya Narayana, Siddhant Manocha and Vanya Jauhal*

o   Predicting Hospital Readmission Rates in Diabetes Patients with *Ankit Kumar, Bhuvan MS, Vinith Kishore and Adil Zafar*

o   Comic Translation with *Akshay Dixit, Gaurav Bansal, Selva Priyanka, Aman Raj, Harshvardhan Solanki and Farhat Abbas*

o   Learning Features with Color and Depth Images with *Arvind Srinivas, Kumar Krishna, Vinith Venkatesan, Pulkit Pattnaik and Ayush*

### *Winter Hackathon, IIT Kanpur, India  (Dec 2013; Video)*

o   Object Tracking with AR2 Drone with *Ankita Pasricha*

o   Infexious: Spatially Local Social Networks with *Thirukovalluru Raghuveer and Enayat Ullah.*

o   RoboMan: Interactive Social Robot with *Nitish Gupta, Saket Kanodia and Vivek Kumar*

o   Clustering Research Papers with *Pankaj Gupta*

## LEADERSHIP

o   Chief Architect, SafelyYou Inc. (2018-)

o   General Secretary, Science & Technology Council, IIT Kanpur (Elected; 2010-11)

o   Vice-Captain, Institute Aquatics Team (IIT Kanpur; 2009-10)

o   Coordinator, Cryptography Contest-Techkriti-09 (Inter-Collegiate Technical Festival of IIT Kanpur; 2009)