

Reza Abbasi-Asl

CONTACT INFORMATION Department of Electrical Engineering and Computer Sciences
University of California, Berkeley *E-mail:* abbasi@eecs.berkeley.edu
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EDUCATION **University of California, Berkeley, CA, USA**
PhD., Electrical Engineering and Computer Sciences, **Sep 2013 - Present**
Designated Emphasis in Communication, Computation and Statistics
• Advisor: Prof. Bin Yu

Sharif University of Technology, Tehran, Iran
M.Sc., Biomedical Engineering (Bioelectronics), GPA: 18.35 / 20 **Sep 2010 - Jan 2013**
• Thesis Topic: *Feature-Based Local Registration of Brain MR Images*
• Advisor: Prof. Emad Fatemizadeh

Tehran Polytechnic (Amirkabir University of Technology), Tehran, Iran
B.Sc., Electrical Engineering (Telecommunication), GPA: 18.24 / 20 **Sep 2006 - Sep 2010**
• Advisor: Prof. Abbas Mohammadi
B.Sc., Electrical Engineering (Electronics), GPA: 18.18 / 20 **Sep 2006 - Sep 2010**
• Advisor: Prof. Abbas Mohammadi

National Organization for Development of Exceptional Talents, Tabriz, Iran
Pre-University Diploma, Mathematics and Physics, GPA: 19.25 / 20 **Sep 2005 - Sep 2006**

VISITING POSITIONS **Simons Institute for the Theory of Computing, Berkeley, CA, US**
Long-Term Visiting Scholar **Jan 2015 - May 2015**

RESEARCH INTERESTS Machine Learning, Computer Vision, Computational Neuroscience, Statistical Modeling, Image Analysis, Signal Processing

PROFESSIONAL EXPERIENCE **Yu Group, University of California, Berkeley, CA.**
Graduate Student Researcher, Mentor: Bin Yu **Sep 2013-Present**
• Structural compression of deep neural networks
• Interpreting artificial neural networks through compression
• Explaining pattern selectivity of neurons in V4 area of the brain using deep nets.
(*Collaborators: Yuansi Chen, Adam Bloniarz, Michael Oliver, Jack L. Gallant*)
• Explaining human brain fMRI responses to natural movies using temporally-modified neural networks. (*Collaborators: Anwar Nunez-Elizalde, Michael Oliver, Jack L. Gallant*)

Neuralink, San Francisco, CA.
Research Intern, Mentor: Philip Sabes **May 2017-Aug 2017**
• Robust high-bandwidth brain-machine interface
(*Collaborators: Paul Merolla*)

Gallant Lab, University of California, Berkeley, CA.
Graduate Student Researcher, Mentors: Jack L. Gallant & Bin Yu **Sep 2015 - Dec 2015**

Simons Center for Data Analysis, Simons Foundation, New York, NY.
Summer Research Associate, Mentor: Dmitri B. Chklovskii **May 2015-Aug 2015**
• Analysis of retinal ganglion cell responses to natural movies.
(*Collaborators: Cengiz Pehlevan and Bin Yu*)

Biomedical Signal and Image Processing Laboratory (BiSIPL)
Sharif University of Technology, Tehran, Iran
Research Assistant, Mentor: Emad Fatemizadeh **Sep 2010-Sep 2013**
• Robust image registration via multi-resolution techniques
• Min/Max pooling in feature-based image analysis

- Estimation of formal neural information using Hammerstein-Wiener model
- Nonlinear estimation of human muscle force from EMG signals

Agfa Healthcare, Tehran, Iran

Technical Director Assistant, Mentor: Ahmad Noori

Sep 2011- Sep 2013

- Technical expert of MR, CT and Radiography digitizers and printers

HONORS &
AWARDS

- Seventh and Eighth International Workshops on Statistical Analysis of Neural Data **Travel Award Winner**, Pittsburgh, PA. **2015, 2017**
- **UC Berkeley Departmental Fellowship** **2013**
- **Best Paper Finalist** in 7th Iranian Conference on Machine Vision and Image Processing (MVIP 2011)
- **Excellence Award** in Biomedical Engineering at Sharif University of Technology **2010**
- **Excellence Award** in Electrical Engineering at Amirkabir University of Technology **2007**
- **Undergraduate Entrance Scholarship** awarded to top ranked students in the nation-wide university entrance exam at Amirkabir University of Technology **2006**
- Semi-finalist of National Physics Olympiads and Chemistry Olympiads, Iran **2004**
- Member of National Organization for Development of Exceptional Talents **1999-2006**

ONLINE
PRE-PRINTS

- **R. Abbasi-Asl** and B. Yu. Structural Compression of Convolutional Neural Networks, *arXiv preprint*, 2017.

PEER-
REVIEWED
PUBLICATIONS

- **R. Abbasi-Asl** and B. Yu. Interpreting Convolutional Neural Networks Through Structural Compression, accepted for publication in *NIPS Symposium on Interpretable Machine Learning*, 2017.
- **R. Abbasi-Asl**, C. Pehlevan, B. Yu and D. B. Chklovskii. Do retinal ganglion cells project natural scenes to their principal subspace and whiten them? *IEEE Proceedings of 50th Asilomar Conference on Signals, Systems and Computers*, Pacific Grove, CA, 2016.
- A. Ahadi, H. Hayati, J. Mitra, **R. Abbasi-Asl**, K. Awodele. A new method for estimating the longevity and degradation of photovoltaic systems considering weather states. *Frontiers in Energy*. 2016; 10 (3) :277 - 285.
- **R. Abbasi-Asl**, R. Khorsandi, B. Vosooghi Vahdat. Hammerstein-Wiener Model: A New Approach to the Estimation of Formal Neural Information. *Basic and Clinical Neuroscience*. 2012; 3 (4) :45-51.
- **R. Abbasi-Asl**, Y. M. Marghi, B. Vosoughi-Vahdat. Estimation of Formal Neural Information Using Hammerstein-Wiener Model. In: *IEEE Proceedings of The 16th CSI Symposium on Artificial Intelligence and Signal Processing (AISP2012)*, Iran, 2012.
- A. Ghanbari, **R. Abbasi-Asl**, A. Ghaffari, E. Fatemizadeh. Automatic B-spline Image Registration Using Histogram-based Landmark Extraction. In: *IEEE-EMBS Conference on Biomedical Engineering & Sciences*, 2012.
- **R. Abbasi-Asl**, E. Fatemizadeh. MMRO: A Feature Selection Criterion for MR Images Based on Alpha Stable Filter Responses. In: *IEEE Proceedings of 7th Iranian Conference on Machine Vision and Image Processing (MVIP2011)*, Iran, 2011. (**Best Paper Finalist**)
- **R. Abbasi-Asl**, R. Khorsandi, Sh. Farzampour, E. Zahedi. Estimation of Muscle Force with EMG Signals Using Hammerstein-Wiener Model. In: *IFMBE Proceedings 5th Kuala Lumpur International Conference on Biomedical Engineering (BIOMED2011)*, Malaysia, Vol. 35, pp. 157-160, 2011.
- S. Abadpour, **R. Abbasi-Asl**, Gh. Moradi. Analysis of Push-Push Oscillators and Designing a Push-Push Oscillator in S Band. In: *IEEE Proceedings of 10th Mediterranean Microwave Symposium (MMS2010)*, Turkey, 2010.

- CONFERENCE ABSTRACTS
- **R. Abbasi-Asl**, Y. Chen, A. Bloniarz, M. Oliver, J. L. Gallant and B. Yu. Deep Nets Meet Real Neurons: Pattern Selectivity in V4, *8th International Workshop on Statistical Analysis of Neuronal Data (SAND8)*, Pittsburgh, PA, 2017. (Accepted abstract and poster presentation)
 - **R. Abbasi-Asl**, Y. Chen, A. Bloniarz, J. L. Gallant and B. Yu. Artificial Neurons Meet Real Neurons: Pattern Selectivity In V4, *INFORMS Annual Meeting*, Nashville, TN, 2016. (Invited oral presentation)
 - **R. Abbasi-Asl**, Y. Chen, A. Bloniarz, J. Mairal, J. L. Gallant and B. Yu. Explaining V4 Neurons Pattern Selectivity via Convolutional Neural Network, *7th International Workshop on Statistical Analysis of Neuronal Data (SAND7)*, Pittsburgh, PA, 2015. (Accepted abstract and poster presentation)
 - **R. Abbasi-Asl**, R. Khorsandi, N. Mozaffari, Sh. Farzampour. A Novel Model for Estimation of the Forearm Motor Forces Using EMG Signals. In: *Proceedings of The 1st International Congress of Neuromuscular and Electrodiagnostic Medicine*, Iran, 2011. (Accepted abstract and poster presentation)
- POSTER PRESENTATIONS
- Feature Representation for Modeling Visual Cortex Area V4: Dictionary Learning vs. Deep Convolutional Networks, *Berkeley Statistics Annual Research Symposium (BSTARS)*, Berkeley, US, 2015. (Poster presentation and thunder talk)
 - Higher-level Representations of Natural Images and Movies for Modeling Extrastriate Visual Cortex Regions, *Center for Science of Information Summer School on Information in Neural Systems and Life Sciences*, UCSD, San Diego, US, 2014. (Poster presentation)
 - Feature Representation for Modeling Visual Cortex Area V4: Dictionary Learning vs. Deep Convolutional Networks, *Center for Science of Information NSF site visit*, Purdue University, West Lafayette, US, 2014. (Poster presentation)
- MANUSCRIPTS IN PREPARATION
- **R. Abbasi-Asl**, Y. Chen, A. Bloniarz, M. Oliver, J. L. Gallant and B. Yu. Deep Nets Meet Real Neurons: Pattern Selectivity in V4. (in preparation)
 - **R. Abbasi-Asl** and B. Yu. Compressed and interpretable models of neurons in area V4 of visual cortex. (in preparation)
 - **R. Abbasi-Asl**, A. Nunez-Elizalde, M. Oliver, J. L. Gallant and B. Yu, Temporally-modified convolutional neural networks can predict fMRI responses evoked by naturalistic movies. (in preparation)
 - **R. Abbasi-Asl** and Emad Fatemizadeh, Robust Image Registration via Bidimensional Empirical Mode Decomposition. (in preparation)
- ADVISING EXPERIENCE
- Mentor, University of California, Berkeley
Zhiyue Hu, Undergraduate Research Assistant Summer - Fall 2017
 - Mentor, University of California, Berkeley
Dennis Mingyi Wang, Undergraduate Research Assistant Summer - Fall 2017
 - Advisor, Sharif University of Technology
Zahra Shabgard, M.Sc. Research Assistant 2012
- TEACHING EXPERIENCE
- University of California, Berkeley, CA, USA**
Graduate Student Instructor
- EE 120: Signals and Systems Spring 2016 & Spring 2017
 - EE 20: Structure and Interpretation of Systems and Signals Spring 2015
- Sharif University of Technology, Tehran, Iran**
Teaching Assistant
- Medical Imaging Systems Fall 2012
 - Introduction to Biomedical Engineering Fall 2012

- Biomedical Image Analysis and Processing Spring 2012
- Neural Modeling Spring 2012

Laboratory Supervisor

- Analog Circuits Spring 2011

Tehran Polytechnics (Amirkabir University of Technology), Tehran, Iran

Teaching Assistant

- Engineering Mathematics (2 sections) Fall 2010
- Probability and Statistics (2 sections) Spring 2010
- Electromagnetics Fall 2009
- Fundamental of Electrical Engineering Fall 2009

SELECTED
GRADUATE
COURSEWORK

University of California, Berkeley, CA, US

Statistical Learning Theory, Statistical Models: Theory and Application, Topics in Deep Learning, Visual Cognitive Neuroscience, Stochastic Systems: Estimation and Control, Theoretical Statistics

Sharif University of Technology, Tehran, Iran

Sparsity and Blind Source Separation, Advanced Biomedical Signal Processing, Medical Imaging Systems, Numerical Optimization, Biomedical Image Analysis and Processing, Neural Modeling

ACADEMIC
SERVICES

- **Invited Reviewer** for the Innovations in Theoretical Computer Science Conference, IEEE Symposium on Computers & Informatics, IEEE Conference on Control, Systems & Industrial Informatics, IEEE Business Engineering and Industrial Applications Colloquium, IEEE Colloquium on Humanities, Science and Engineering,
- IEEE Iran section, Student Branch of Tehran Polytechnics
Chairman of publicity committee Sep 2009-Sep 2010
- 2nd AUT Electrical Engineering Week, Communication and Electronics conference
Chairman of scientific committee Nov 2009

AFFILIATIONS &
MEMBERSHIPS

- Berkeley AI Research Laboratory (BAIR), CA, US 2014-present
- NSF Center for Science of Information (CSoI) 2013-present
- Berkeley Laboratory of Information and System Sciences (BLISS), CA, US 2013-present
- IEEE Brain Community 2016-present
- American Statistical Association (ASA) 2014
- Institute of Mathematical Statistics (IMS) 2014
- Institute for Electrical and Electronics Engineers (IEEE) 2008-2010, 2014-present
- Iranian Society of Machine Vision and Image Processing 2010-2013

SKILLS

Computer Skills

- Python, MATLAB, R, C/C++, Octave, Bash Scripting
- Experience using machine learning toolboxes (Caffe, TensorFlow, Keras, SPAMS)
- OS X, Linux, Windows, Vim, L^AT_EX, Microsoft Office.

Languages

- English (fluent), Persian (native), Azerbaijani (native)

HOBBIES

Photography (check it out at: eecs.berkeley.edu/~abbasi/photography), Hiking, Persian Calligraphy

REFERENCES

Bin Yu (e-mail: binyu@stat.berkeley.edu)

- Chancellor's Professor, Statistics, Electrical Engineering and Computer Sciences, UC Berkeley

Jack Gallant (e-mail: gallant@berkeley.edu)

- Professor, Helen Wills Neuroscience Institute, Program in Bioengineering, and Department of Psychology, UC Berkeley

Dmitri Mitya Chklovskii (e-mail: dchklovskii@simonsfoundation.org)

- Group Leader for Neuroscience, Simons Center for Data Analysis, Simons Foundation

Venkat Anantharam (e-mail: ananth@eecs.berkeley.edu)

- Professor, Electrical Engineering and Computer Sciences, UC Berkeley

Emad Fatemizadeh (e-mail: fatemizadeh@sharif.edu)

- Assistant Professor, Electrical Engineering, Sharif University of Technology