Dr. Sathya Narayanan Ravi

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EDUCATION

University of Wisconsin, Madison

- PhD., Computer Sciences,   Fall 15 - Summer 19
  Focus: The Wonderful World of Constraints in Learning and Vision

- Master of Arts, Mathematics,   Spring 15 - Spring 17
  Focus: Algebra and Algebraic Topology

- Master of Science, Industrial and Systems Engineering,   Fall 11 - Fall 14
  Focus: Operations Research and Optimization

NIT Trichy, India

- Bachelor of Technology, Engineering   Fall 07 - Summer 11

PUBLICATIONS

Full List of Peer Reviewed Conferences/Journals

1. Zihang Meng, Sathya N. Ravi, and Vikas Singh, " Physarum Powered Differentiable Linear Programming Layers and Applications", **AAAI** 2021, ⊘

2. Aditya Kumar Akash, Vishnu Suresh Lokhande, Sathya N. Ravi, and Vikas Singh, "Learning Invariant Representations using Inverse Contrastive Loss", **AAAI** 2021, ⊘

3. Vishnu Suresh Lokhande, Aditya Kumar Akash, Sathya N. Ravi, and Vikas Singh, "FairALM: An Augmented Lagrangian Method for Training Fair Models with Little Regret", **ECCV** 2020, ⊘

4. Vishnu Suresh Lokhande, Songwong tasneeyapant, Abhay Venkatesh, Sathya N. Ravi and Vikas Singh, "Generating Accurate Pseudo-labels in Semi-Supervised Learning and Avoiding Overconfident Predictions via Hermite Polynomial Activations", **CVPR** 2020, ⊘

5. Sathya N. Ravi, Abhay Venkatesh, Glenn M. Fung, Vikas Singh, "Optimizing Nondecomposable Data Dependent Regularizers via Lagrangian Reparameterization offers Significant Performance and Efficiency Gains", **AAAI** 2020, **Oral Presentation**, ⊘

6. Yiyou Sun, Sathya N. Ravi, Vikas Singh, "Adaptive Activation Thresholding: Dynamic Routing Type Behavior for Interpretability in Convolutional Neural Networks", **ICCV** 2019, ⊘

7. Sathya N. Ravi, Tuan Dinh, Vishnu Lokhande, Vikas Singh, "Explicitly Imposing Constraints in Deep Networks Via Conditional Gradients Gives Improved Generalization and Faster Convergence", **AAAI** 2019, **Oral** Presentation, ⊘

8. Sathya N. Ravi, Maxwell D. Collins, Vikas Singh, "A Deterministic Nonsmooth Frank-Wolfe Algorithm with Coreset guarantees.", INFORMS Journal on Optimization' 2019, ⧉

9. Seong Jae Hwang, Sathya N. Ravi, Zirui Tao, Hyunwoo J. Kim, Maxwell Collins, Vikas Singh, "Tensorize, Factorize and Regularize: Robust Visual Relationship Learning", **CVPR** 2018, ⊘

10. Lopamudhra Mukherjee, Sathya N. Ravi, Jiming Peng, Vikas Singh, "A Biresolution Spectral framework for Product Quantization", **CVPR** 2018, ⊘

11. Sathya N. Ravi, Yunyang Xiong, Lopamudhra Mukherjee, Vikas Singh, "Filter Flow made Practical: Massively Parallel and Lock-Free", **CVPR** 2017, ⊘

12. Hao Henry Zhou, Sathya Ravi, Vamsi K. Ithapu, Sterling C. Johnson, Grace Wahba, Vikas Singh, "Hypothesis Testing in Unsupervised Domain Adaptation with Applications in Alzheimer's Disease", **NIPS** 2016, ⊘

13. Vamsi K. Ithapu, Sathya N. Ravi, Vikas Singh, "On the interplay of network structure and gradient convergence in deep learning", **Allerton** 2016, ⧉

14. Sathya N. Ravi, Vamsi K. Ithapu, Sterling C. Johnson, Vikas Singh, "Experimental Design on a Budget for Sparse Linear Models and Applications", **ICML** 2016, ⊘

15. Seong Jae Hwang, Nagesh Adluru, Maxwell D. Collins, Sathya N. Ravi, Barbara B. Bendlin, Sterling C. Johnson, Vikas Singh, "Coupled Harmonic Bases for Longitudinal Characterization of Brain Networks", **CVPR** 2016, ⚭

16. Lopamudhra Mukherjee, Sathya N. Ravi, Vamsi K. Ithapu, Vikas Singh, "An NMF perspective on binary hashing", **ICCV** 2015, ⚭

17. Wonhwa Kim, Sathya N. Ravi, Sterling C. Johnson, Ozioma C. Okonkwo, Vikas Singh, "On statistical analysis of Neuroimages with imperfect registration", **ICCV** 2015, ⚭

18. Seong Jae Hwang, Maxwell Collins, Sathya N. Ravi, Vamsi K. Ithapu, Nagesh Adluru, Sterling C. Johnson, Vikas Singh, "A projection free method for generalized eigenvalue problem with a nonsmooth regularizer", **ICCV** 2015, ⚙

Preprints/Under Review

1. Zihang Meng, Yiyou Sun, Sathya N. Ravi, Baba C. Vemuri, Vikas Singh, "Learning Enabled Active Contour Models for Supervised and Semi-supervised Segmentation", Under Review

2. Sathya N. Ravi, Ronak Mehta, Vikas Singh, "Provably Robust Blind Deconvolution via Mirror Descent", Under Review, ⚙

3. Sathya N. Ravi, Yunyang Xiong, Nagesh Adluru, Vikas Singh, "Covariate Assisted Graphons: Algorithms and Applications", Under review, ⚙

Abstracts

1. Seong Jae Hwang, Sathya N. Ravi, Nagesh Adluru, Barbara B. Bendlin, Sterling C. Johnson, Vikas Singh, "Data-Driven Propagation Modeling of PET-Derived Alzheimer's Pathology in a Preclinical Cohort", **AAIC** 2018, ⚭

2. Hao Zhou, Sathya N. Ravi, Vamsi K. Ithapu, Vikas Singh, Sterling C. Johnson, Grace Wahba, Rebecca L. Koscik, Sanjay Asthana, Cynthia M. Carlsson, Kaj Blennow, Henrik Zetterberg,"Statistical Algorithms for Harmonizing Biomarker Distributions across Different Cohorts, Sites and Assays: Applications to CSF Measurements", **AAIC** 2017, ⚭

3. Sathya N. Ravi, Vamsi K. Ithapu, Vikas Singh, Rebecca L. Koscik, Sterling C. Johnson, "Machine Learning Algorithms for Experiment Design in High Dimensional Longitudinal Cohort Studies: Implications for Clinical Trials", **AAIC** 2017, ⚭

EXPERIENCE

Assistant Professor   Fall 19 - Current
Department of Computer Science at University of Illinois at Chicago, ⚭

Research Assistant and Collaborator   Spring 14 - Summer 19
Department of Computer Scienes at UW Madison, ⚭

Research Scientist Internship – Amazon   Summer 18
Worked with the Rekognition team on various Computer Vision problems on Semi-Supervised settings, 𝖆

PCMI Summer School   Summer 16
Attended the summer school on "The Mathematics of Data" organized by the Institute of Advanced Studies, Princeton, New Jersey with full scholarship, ⚭

Teaching Assistant   Fall 12 - Fall 14
Department of Mathematics, University of Wisconsin, Madison
- Conducted discussion sessions for various undergraduate courses and consistently rated high, ⚭

Teaching

1. **UIC CS 415:** Advanced Computer Vision, Spring 2021
2. **UIC CS 415:** Computer Vision I, Spring 2020
3. **UIC CS 594:** Learning and Optimization in Vision, Fall 2020

4. **UW Madison:** Math 222 – Calculus II (Fall 2012, Spring 2013)

5. **UW Madison:** Math 114 – Elementary Algebra and Trigonometry (Fall 2013)

6. **UW Madison:** Math 171 – Business Calculus (Spring 2014, Fall 2014)

7. **UW Madison:** Math 221 – Calculus I (Spring 2015)

External Service

1. Funding Agency Panelist for Nation Science Foundation 2020, 2021.

2. Program Committee member and reviewer in top tier Computer Science conferences such as:

    (a) Computer Vision and Pattern Recognition (CVPR) – 2017, 2018, 2019, 2020 (excellent reviewer recognition), 2021;

    (b) European Conference on Computer Vision (ECCV) – 2017, 2018, 2019, 2020;

    (c) International Conference on Learning Representations (ICLR) – 2019, 2020, 2021;

    (d) Winter Conference on Applications of Computer Vision (WACV) – 2019, 2020, 2021;

    (e) Neural Information Processing Systems (NeurIPS) – 2016, 2017, 2018, 2020;

    (f) Asian Conference on Computer Vision (ACCV) – 2018, 2020

    (g) International Joint Conference on Artificial Intelligence (IJCAI) – Senior Program Committee - 2021

3. Served as an reviewer for top tier journals such as:

    (a) IEEE Transactions on Pattern Analysis and Machine Intelligence – 2019, 2020;

    (b) American Association for the Advancement of Science journal on Science Advances – 2019.

4. Invited talks at:

    (a) Association for the Advancement of Artificial Intelligence 2019 and 2020

    (b) Midwest Machine Learnign Seminar 2018 **(shortlisted as top three presentations)**, 2019 **(best paper/presentation award).**

    (c) Purdue University virtual seminar 2019

    (d) University of Hawaii at Mano 2019

    (e) Solo organizer of **WACV 2018 tutorial session on "Optimization Methods for Deep Learning - Theory and Practice"** – prepared material and delivered a tutorial presentation for 210 minutes (attended by about 750 people), ⚭

    (f) International Conference on Machine Learning 2016 on Experimental Design for Sparse Linear Models and Applications to Neuroscience

5. Co-owner of the following patents:

    (a) US Patent called "Training System for Artificial Neural Networks Having a Global Weight Constrainer" filed on 11/09/2018 for my optimization algorithm