

# SIRISHA RAMBHATLA

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CONTACT INFORMATION	Carl Pollock Hall (CPH) 4358, 200 University Ave. W., Waterloo, ON, Canada	E-mail: <a href="mailto:sirisha.rambhatla@uwaterloo.ca">sirisha.rambhatla@uwaterloo.ca</a> Homepage: <a href="http://www.sirisharambhatla.com">www.sirisharambhatla.com</a> LinkedIn: <a href="http://www.linkedin.com/in/sirisharambhatla/">www.linkedin.com/in/sirisharambhatla/</a>
RESEARCH FOCUS	Statistical Machine Learning, Spatiotemporal Data Analysis, AI for Surgery and Healthcare, Sparse Signal Processing, Interpretability of Deep Learning Models, Intelligent Automation, and Computer Vision	
EDUCATION	<b>Doctor of Philosophy (Ph.D.)</b> in Electrical Engineering University of Minnesota – Twin Cities Thesis: <i>Provably Learning from Data: New Algorithms for Matrix/Tensor Decompositions &amp; Factorizations</i> Advisor: Prof. Jarvis Haupt Committee Members: Prof. Georgios B. Giannakis, Prof. Nikos Papanikolopoulos, Prof. Mingyi Hong	Sep. 2014 – Sep. 2019 Minneapolis, MN
	<b>Master of Science (M.S.)</b> in Electrical Engineering University of Minnesota – Twin Cities Thesis: <i>Semi-Blind Source Separation via Sparse Approximation &amp; Online Dictionary Learning</i> Advisor: Prof. Jarvis Haupt Committee Members: Prof. Zhi-Quan Luo, Prof. Arindam Banerjee	Aug. 2010 – Dec. 2012 Minneapolis, MN
	<b>Bachelor of Technology (B.Tech) Honors</b> in Electronics & Telecom. Eng. College of Engineering Roorkee (COER) <b>University Bronze Medalist</b>	Aug. 2006 – May 2010 Roorkee, India
EXPERIENCE	<b>Tenure-Track Assistant Professor</b> University of Waterloo Management Sciences Department, Faculty of Engineering ( <i>Primary</i> ) David R. Cheriton School of Computer Science, Faculty of Mathematics ( <i>Cross-appointment</i> ) Systems Design Engineering Department, Faculty of Engineering ( <i>Cross-appointment</i> )  Faculty Affiliate, Waterloo Artificial Intelligence (AI) Institute Faculty Affiliate, Waterloo Institute for Sustainable Aeronautics (WISA)	July. 2021 – Present Waterloo, ON, Canada
	<b>Postdoctoral Scholar – Research Associate</b> Computer Science Department University of Southern California Mentor: Prof. Yan Liu	Oct. 2019 – July, 2021 Los Angeles, CA, USA
	<b>Graduate Research Assistant</b> Department of Electrical and Computer Engineering University of Minnesota – Twin Cities	Aug. 2014 – Sept. 2019 Minneapolis, MN, USA
	<b>Explore Computer Science Research (ExplorCSR) Mentor</b> Volunteer Group Leader Google Research	Oct. 2018 – Feb. 2019 Minneapolis, MN, USA
	<b>Science Advisor</b> Intellectual Property (IP) and Technology Litigation Robins Kaplan LLP	Mar. 2013 – Jun. 2014 Minneapolis, MN, USA
	<b>Engineering Intern (R&amp;D)</b> Technology and Engineering Division	Jun.– Aug. 2011 & Jun.– Oct. 2012 St. Paul, MN, USA

Ativa Medical Inc.

**Graduate Research Assistant**

Feb. 2011 – May 2011 & Aug. 2011 – May 2012

Department of Electrical and Computer Engineering  
University of Minnesota – Twin Cities

Minneapolis, MN, USA

**Undergraduate Research Intern**

May 2009 – Jul. 2009

Networked Control Systems Lab

Kanpur, India

Indian Institute of Technology Kanpur (IIT-K)

AWARDS AND HONORS	Highlighted Reviewer ( 8% of reviewers), <i>International Conference on Learning Representations (ICLR)</i>	2022
	Outstanding Paper Presentation Award, <i>Plastic Surgery: the Meeting</i>	2021
	Merit Award for Excellence in Postdoctoral Research, <i>WiSE, University of Southern California</i>	2020 – 21
	ICLR Travel Award, <i>International Conference on Learning Representations (ICLR)</i>	2019
	Selected Presenter, “Graduation Day” Session, <i>Information Theory &amp; Applications Workshop</i>	2019
	Finalist, Student Best Paper Award, <i>Asilomar Conference on Signals, Systems &amp; Computers</i>	2017
	National Science Foundation (NSF) Travel Award, <i>GlobalSIP</i>	2016
	E. Bruce Lee Memorial Fellowship, <i>University of Minnesota – Twin Cities</i>	2014 – 2015
	SciTechsperience Fellowship, <i>Minnesota High Tech Association</i>	2012
	University Merit List, Third Place – ECE (Bronze Medal), <i>Uttarakhand Technical University, India</i>	2010
	Proficiency Award for Academic Excellence, <i>COER, India</i>	2009 – 10
	Proficiency Award for Academic Excellence, <i>COER, India</i>	2006 – 07

- PUBLICATIONS [1] G. Punchhi\*, Y. Sun\*, **S. Rambhatla**, M. Bhat. Predicting Future Trajectories of the Waitlisted NASH patient using Deep Learning. International Liver Transplantation Society (ILTS) Annual Congress, *Abstract*, 2022. **Selected for Oral Presentation**
- [2] **S. Rambhatla**, Z. Che, and Y. Liu. I-SEA: Importance Sampling and Expected Alignment-based Deep Distance Metric Learning for Time Series Analysis and Embedding. *36th Association for the Advancement of Artificial Intelligence (AAAI) conference on Artificial Intelligence*, 2022.
- [3] A. B. Chen, T. Haque, S. Roberts, **S. Rambhatla**, G. Cacciamani, P. Dasgupta, A. J. Hung. Artificial Intelligence Applications in Urology: Reporting Standards to Achieve Fluency for Urologists. *Urology Clinics North America*, 2022.
- [4] **S. Rambhatla\***, S. Zeighami\*, K. Shahabi, C. Shahabi, and Y. Liu. Towards Accurate Spatiotemporal COVID-19 Risk Scores using High Resolution Real-World Mobility Data. *ACM Transactions on Spatial Algorithms and Systems (TSAS)* , 2022. [\[Link\]](#)
- [5] A. J. Hung, **S. Rambhatla**, D. I. Sanford, N. Pachauri, E. Vanstrum, J. H. Nguyen, and Y. Liu. Road to Automating Robotic Suturing Skills Assessment: Battling Mislabeling of the Ground Truth. *Surgery*, 2021.
- [6] **S. Rambhatla\***, S. Huang\*, L. Trinh, M. Zhang, M. Dong, V. Unadkat, H. A. Yenikomshian, J. Gillenwater, and Y. Liu. DL4Burn: Burn surgical candidacy using multimodal deep learning. *American Medical Informatics Association (AMIA) Annual Symposium*, 2021.
- [7] S. Huang\*, **S. Rambhatla\***, L. Trinh, M. Zhang, M. Dong, V. Unadkat, J. Lin, M. K. Sheth, J. Dang, H. A. Yenikomshian, Y. Liu, and J. Gillenwater. Predicting burn surgical candidacy using deep learning on photographic images. *Plastic Surgery: the Meeting, Abstract*, 2021. **Outstanding Paper Presentation Award**
- [8] C. Meng, **S. Rambhatla**, and Y. Liu. Cross-Node Federated Graph Neural Network for Spatio-Temporal Data Modeling. *ACM SIGKDD International Conference on Knowledge Discovery & Data Mining (KDD)*, 2021.
- [9] N. Kamra, Y. Zhang, **S. Rambhatla**, C. Meng, and Y. Liu. PolSIRD: Modeling Epidemic Spread

Under Intervention Policies: Analyzing the First Wave of COVID-19 in the USA. *Journal of Healthcare Informatics Research*, 2021. [\[Link\]](#)

[10] A. J. Hung, **S. Rambhatla**, N. Pachauri, D. I. Sanford, J. H. Nguyen, and Y. Liu. Automating suturing skills assessment with a limited surgeon dataset: Meta learning. *American Urology Association, Journal of Urology, Abstract*, 2021. **Selected for Podium Talk**

[11] S. Seo\*, C. Meng\*, **S. Rambhatla**, and Y. Liu. Physics-aware Spatiotemporal Modules with Auxiliary Tasks for Meta-Learning. *International Joint Conferences on Artificial Intelligence (IJCAI)*, 2021. [\[Link\]](#)

[12] L. Trinh, M. Tsang, **S. Rambhatla**, and Y. Liu. Interpretable and Trustworthy Deepfake Detection via Dynamic Prototypes. *IEEE Winter Conference on Applications of Computer Vision (WACV)*, 2021. [\[Link\]](#)

[13] M. Tsang, **S. Rambhatla**, and Y. Liu. How does this interaction affect me? Interpretable attribution for feature interactions. *Advances in Neural Information Processing Systems (NeurIPS)*, 2020. [\[Link\]](#)

[14] **S. Rambhatla**, X. Li, and J. Haupt. Provable Online CP/PARAFAC Decomposition of a Structured Tensor via Dictionary Learning. *Advances in Neural Information Processing Systems (NeurIPS)*, 2020. [\[Link\]](#)

[15] **S. Rambhatla**, X. Li, J. Ren and J. Haupt. A Dictionary-Based Generalization of Robust PCA With Applications to Target Localization in Hyperspectral Imaging. *IEEE Transactions on Signal Processing*, vol. 68, pp. 1760 – 1775, 2020. [\[Link\]](#)

[16] **S. Rambhatla**, X. Li, and J. Haupt. NOODL: Provable Online Learning for Dictionary Learning and Sparse Coding. *International Conference on Learning Representations (ICLR)*, 2019. **Travel Award**. [\[Link\]](#)

[17] **S. Rambhatla**, N. Sidiropoulos, and J. Haupt. TensorMap: Lidar-based Topological Mapping and Localization via Tensor Decompositions. *IEEE Global Conference on Signal and Information Processing (GlobalSIP)*, 2018. [\[Link\]](#)

[18] X. Li, J. Ren, **S. Rambhatla**, Y. Xu, and J. Haupt. Robust PCA via Dictionary Based Outlier Pursuit. *IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, 2018. [\[Link\]](#)

[19] **S. Rambhatla**, X. Li, and J. Haupt. Target Based Hyperspectral Demixing via Generalized Robust PCA. *Asilomar Conference on Signals, Systems, and Computers (Asilomar)*, 2017. **Student Best Paper Award Finalist**. [\[Link\]](#)

[20] **S. Rambhatla**, X. Li, and J. Haupt. A Dictionary Based Generalization of Robust PCA. *IEEE Global Conference on Signal and Information Processing (GlobalSIP)*, 2016. **National Science Foundation (NSF) Travel Award**. [\[Link\]](#)

[21] **S. Rambhatla** and J. Haupt. Semi-Blind Source Separation via Sparse Representations and Online Dictionary Learning. *Asilomar Conference on Signals, Systems, and Computers (Asilomar)*, 2013. [\[Link\]](#)

WORKSHOP  
AND DEMO  
PAPERS

[22] J. Park, K. Kaai, S. Hossain, N. Sumi, **S. Rambhatla**, P. Fieguth. Building Spatio-temporal Transformers for Egocentric 3D Pose Estimation. *Joint International Workshop on Egocentric Perception, Interaction and Computing (EPIC) and Ego4D, IEEE/CVF Computer Vision and Pattern Recognition Conference (CVPR)*, 2022. **Oral Presentation**.

[23] N. Xu\*, L. Trinh\*, **S. Rambhatla**, S. Assefa, J. Chen, Z. Zeng, and Y. Liu. Simulating continuous-time human mobility trajectories. *Deep Learning for Simulation Workshop, International Conference on Learning Representations (ICLR)*, 2021.

[24] S. Seo\*, C. Meng\*, **S. Rambhatla**, Y. Liu. Physics-aware Spatiotemporal Modules with Auxiliary Tasks for Meta-Learning. *Neural Information Processing Systems (NeurIPS) Workshop on Machine Learning and the Physical Sciences*, 2020. [\[Link\]](#)

UNDER  
REVIEW

[25] J. Park, K. Kaai, S. Hossain, N. Sumi, **S. Rambhatla**, P. Fieguth. Spatio-temporal Transformers for Egocentric 3D Pose Estimation. *Under Review*, 2022.

- [26] P. Madrigal, L. Trinh, S. Huang, **S. Rambhatla**, R. Bernabe, Y. Liu, H. A. Yenikomshian, J. Gillenwater. Utilizing Deep Learning to Predict Surgical Candidacy on Burn Wound Images: A Prospective Study *Under review*, 2022.
- [27] K. Kaai, P. D. Marshall, N. C. Rowe, J. D. Serez, **S. Rambhatla**. Vysio: an Artificial Intelligence (AI)-Powered Tool for Making Physiotherapy Workflow Effective and Accessible. *System Demonstration Under Review*, 2022.
- [28] N. Xu\*, L. Trinh\*, **S. Rambhatla**, S. Assefa, J. Chen, Z. Zeng, and Y. Liu. Transformer-based Spatiotemporal Dependencies Modeling for Synthetic Data Generation. (*Manuscript Under Review*), 2021.
- [29] K. Sharma, S. Seo, C. Meng, **S. Rambhatla**, Y. Liu. COVID-19 on Social Media: Analyzing Misinformation in Twitter Conversations. (*Under review*), 2020. [\[Link\]](#)

## THESIS

- [30] **S. Rambhatla**. Provably Learning from Data: New Algorithms for Matrix/Tensor Decompositions & Factorizations. (Doctoral Thesis), *Department of Electrical and Computer Engineering, University of Minnesota – Twin Cities, Minneapolis, MN*, 2019.
- [31] **S. Rambhatla**. Semi-Blind Source Separation via Sparse Approximation & Online Dictionary Learning. (Masters Thesis), *Department of Electrical and Computer Engineering, University of Minnesota – Twin Cities, Minneapolis, MN*, 2012.

\* Equal contribution. Preprints/reprints available on [arxiv](#) and at <https://sirisharambhatla.com/publications/>.

## RESEARCH GRANTS

- Start-up Grant (\$45,000 CAD) July 2021  
— *University of Waterloo, Waterloo, ON* Awarded
- *Deep Learning for Human Pose Estimation* (\$50,000 CAD) Mar. 2022  
— Sponsored Research Agreement with Nissan AI and Mobility Lab, Japan Awarded  
— **S. Rambhatla** (PI), P. Fieguth (Co-PI), J. Zelek (Co-PI), D. Clausi (Co-PI), and A. Wong (Co-PI)  
— *University of Waterloo, Waterloo, ON*
- *Novel Video Analytics Through Advanced Deep Learning* (\$11,230 CAD) Apr. 2022 – Mar. 2023  
— *Compute Canada Resource Allocation (RAC)* Awarded  
— P. Fieguth (PI), **S. Rambhatla** (Co-PI) — *University of Waterloo, Waterloo, ON*
- *Data Analytics for Robust Crew Pairing* (\$50,000 CAD) Mar. 2022  
— Sponsored Research Agreement underway with NAVBLUE, ON, Canada Awarded  
— F. Gzara (PI), and **S. Rambhatla** (Co-PI)  
— *University of Waterloo, Waterloo, ON*
- *Interpretable Time Series Representation Learning via Disentanglement and Domain Priors*  
— Discovery Grant (\$445,614 CAD) Apr. 2022 – Mar. 2028  
— *Natural Sciences and Engineering Research Council of Canada (NSERC)* Under Review
- *Improving Explainability of Deep Survival Analysis Models for Healthcare Applications* 2023 – 29  
— Discovery Horizons (Letter of Intent Stage) Under Review  
— **S. Rambhatla** (PI), Mamatha Bhat (Co-PI)  
— *Natural Sciences and Engineering Research Council of Canada (NSERC)*

## TEACHING EXPERIENCE

- Instructor, MSCI - 436 Decision Support Systems (Class size: 76) Spring 2022  
— *University of Waterloo, Waterloo, ON, Canada*
- Instructor, CSCI 567 - Machine Learning (Class size: 85) Spring 2021  
— *University of Southern California, Los Angeles, CA, U.S.A.*
- Guest Lecturer, CSCI 699 - Advanced Topics in Deep Learning (Class size: 40) Fall 2020  
— *University of Southern California, Los Angeles, CA, U.S.A.*
- Guest Lecturer, EE 3025 - Statistical Methods in Elec. and Comp. Eng. (Class size: 150) Fall 2017

— *University of Minnesota – Twin Cities, Minneapolis, MN, U.S.A.*

TALKS/  
POSTERS

- “Theory Guided Machine Learning for the Real World” Nov. 2021  
— *Vision and Image Processing lab, Systems Design Engineering Department, University of Waterloo.*
- “Cross-Node Federated Graph Neural Network for Spatio-Temporal Data Modeling” Aug. 2021  
— *ACM SIGKDD International Conference on Knowledge Discovery & Data Mining (KDD)*
- “Physics-aware Spatiotemporal Modules with Auxiliary Tasks for Meta-Learning” Aug. 2021  
— *International Joint Conferences on Artificial Intelligence (IJCAI).*
- “Provable Online CP/PARAFAC Decomposition via Dictionary Learning” Apr. 2021  
— *Women in Theoretical Machine Learning Symposium, Virtual Symposium.*
- “Provable Online CP/PARAFAC Decomposition via Dictionary Learning” Dec. 2020  
— *Neural Information Processing Systems (NeurIPS), Virtual Conference.*
- “How does this interaction affect me? Interpretable attribution for feature interactions.” Dec. 2020  
— *Neural Information Processing Systems (NeurIPS), Virtual Conference.*
- “Provable Online Dictionary Learning and Sparse Coding” Jun. 2019  
— *CyberOptics Corporation, Minneapolis, MN.*
- “NOODL: Provable Online Dictionary Learning and Sparse Coding” May 2019  
— *International Conference on Learning Representations, New Orleans, LA.*
- “Provable Online Dictionary Learning and Sparse Coding” May 2019  
— *Department of Electrical and Computer Engineering, Georgia Tech., Atlanta, GA.*
- “Provable Online Dictionary Learning and Sparse Coding” Feb. 2019  
— *Information Theory and Applications (ITA) Workshop, San Diego, CA.*
- “Lidar-based Topological Mapping & Localization via Tensor Decompositions.” Nov. 2018  
— *GlobalSIP 2018, Anaheim, CA.*
- “Provable Online Dictionary Learning and Matrix Factorization” Sept. 2018  
— *Digital Technology Center, Minneapolis, MN.*
- “Target-Based Hyper Spectral Demixing via Generalized Robust PCA.” Mar. 2018  
— *ECE Seminar on Signal Processing, Information Theory, and Communication, University of Minnesota – Twin Cities, Minneapolis, MN.*
- “Provably Recovering Patterns from Data: Matrix to Tensors.” Nov. 2017  
— *Yahoo! Research, San Jose, CA.*
- “Dictionary-based Generalization of Robust PCA.” Dec. 2016  
— *GlobalSIP 2016, Washington D.C.*
- “Semi-Blind Source Separation via Sparse Approximation & Online Dictionary Learning.” Nov. 2013  
— *Asilomar Conference on Signals, Systems & Computers, Pacific Grove, CA.*

TECHNICAL  
SERVICE

- Workshop Co-chair, *International Conference on COMMunication Systems & NETWORKS (COMSNETS)* Jan. 2023  
— *Chancery Pavilion Hotel, Bangalore, India*
- Senior Program and Mentorship Co-chair, *Women in Machine Learning Workshop* 2021 – 22  
— *Women in Machine Learning (WiML) at Neural Information Processing Systems (NeurIPS) 2021*
- Workshop Co-chair, *International Conference on COMMunication Systems & NETWORKS (COMSNETS)* Jan. 2022  
— *Chancery Pavilion Hotel, Bangalore, India*
- Organizer & Host, Computer Science Colloquium on “Algorithmic Fairness and the Law” Apr. 2021  
— *University of Southern California, Los Angeles, CA*
- Organizer, *AI for COVID-19 in LA Virtual Symposium* (attended by over 350 participants) 2020  
— *University of Southern California, Los Angeles, CA*
- Ambassador, Women in Data Science (WiDS) 2020  
— *University of Southern California, Los Angeles, CA*



	<ul style="list-style-type: none"> <li>• Organizer, “Patent basics for Engineers and Researchers” 2019 — <i>Digital Technology Center, University of Minnesota–Twin Cities, Minneapolis, MN</i></li> <li>• Session Co-Chair, Reinforcement Learning, and High-dimensional Statistics 2019 — <i>Information Theory and Applications (ITA) Workshop 2019, San Diego, CA</i></li> <li>• Session Chair, Deep Learning-based Signal Processing for Wireless Communication 2018 — <i>GlobalSIP 2018, Anaheim, CA</i></li> <li>• Reviewer, ACM Transactions on Spatial Algorithms and Systems (TSAS), 2022.</li> <li>• Program Committee, Association for the Advancement of Artificial Intelligence (AAAI) 2022, 2021</li> <li>• Reviewer, International Conference on Learning Representations (ICLR) 2021</li> <li>• Reviewer, Neural Information Processing Systems (NeurIPS) 2022, 2021, 2020</li> <li>• Reviewer, International Conference on Machine Learning (ICML) 2022, 2021, 2020</li> <li>• Reviewer, Journal of Selected Topics in Signal Processing (JSTSP) 2020</li> <li>• Reviewer, IEEE Transactions on Pattern Analysis and Machine Intelligence (T-PAMI) 2021, 2020</li> <li>• Reviewer, ACM Transactions on Computing for Healthcare 2021, 2020</li> <li>• Reviewer, International Conference on Artificial Intelligence &amp; Statistics (AISTATS) 2018, 2016</li> <li>• Reviewer, International Conference on Acoustics, Speech &amp; Signal Processing (ICASSP) 2016, 2015</li> <li>• Reviewer, Transactions on Signal Processing (T-SP) 2021, 2020, 2019, 2018, 2016, 2015, 2014</li> <li>• Reviewer, Signal Processing Letters (SPL) 2017</li> <li>• Reviewer, SIAM Journal of Imaging Sciences 2017</li> <li>• Reviewer, Transactions on Industrial Informatics (T-II) 2017</li> </ul>	
WORKSHOPS	<ul style="list-style-type: none"> <li>• “Frontiers in Machine Learning” 2020 — <i>Microsoft Research</i></li> <li>• “IEEE Data Science Workshop (DSW)” 2019 — <i>University of Minnesota Twin-Cities, Minneapolis, MN</i></li> <li>• “Information Theory &amp; Applications Workshop (ITA)” 2019 — <i>San Diego, CA</i></li> <li>• “Resource Trade-offs: Computation, Communication, and Information” 2016 — <i>Institute of Mathematics and its Applications (IMA), Minneapolis, MN</i></li> <li>• “Sparsity and Computation” 2011 — <i>Institute for Advanced Study, Princeton, NJ</i></li> </ul>	
SOFTWARE PACKAGES	<p><b>TensorNOODL:</b> Provable Online CP/PARAFAC Decomposition via Dictionary Learning (MATLAB).</p> <p><b>NOODL:</b> Provable Online Learning Algorithm for Dictionary Learning and Sparse Coding.</p> <ul style="list-style-type: none"> <li>• Distributed implementations via MATLAB and TensorFlow.</li> </ul> <p><b>D-RPCA:</b> Dictionary-Based Generalization of Robust PCA. (MATLAB)</p> <ul style="list-style-type: none"> <li>• Analysis of Theoretical Properties, and Target Localization in Hyperspectral Images.</li> </ul> <p><b>TensorMap:</b> Lidar-based Mapping and Localization via Tensor Decompositions. (MATLAB)</p>	
PROFESSIONAL MEMBERSHIPS	<p>Collegiate Member, <i>Society of Women Engineers (SWE)</i>, since 2018</p> <p>Student Member, <i>IEEE Signal Processing Society (SPS)</i>, since 2018</p> <p>Student Member, <i>IEEE</i>, since 2013</p> <p>Member, <i>Eta Kappa Nu (HKN)</i>, since 2011</p>	