

Rushil Anirudh

Resumé

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Research interests

- Advancing our understanding of machine learning and deep learning motivated by questions from domains like (but not limited to) high energy physics, healthcare, and x-ray imaging.
- Building better representations of data, and to study how these may help improve solving ill-posed inverse problems.
- Making machine learning models more resilient under controllable and uncontrollable distribution shifts in various scenarios.

Education

- March 2016 **PhD**, *Arizona State University*, Tempe, GPA 3.95/4.00.
Advisor: Dr. Pavan Turaga
Thesis: Statistical and Dynamical Modeling of Riemannian Trajectories with Application to Human Movement Analysis [[Thesis Online](#)]
- June 2012 **MS**, *Arizona State University*, Tempe.
- April 2010 **B.Tech**, *National Institute of Technology Karnatka (NITK)*, Surathkal, India.

Experience

- 10/19 - Now **Director**, *Data Science Institute's Open Data Initiative*.
Leading the effort to curate and organize LLNL's rich data ecosystem towards the goal of open sourcing science datasets to drive scientific machine learning. [[webpage](#)]
- 7/18 - Now **Computer Scientist**, *Machine Intelligence Group @ LLNL*.
Projects: scientific machine learning, computational imaging, inverse problems, robustness in ML. [[Group webpage](#)]
- 10/16 - 7/18 **Postdoctoral Researcher**, *Lawrence Livermore National Laboratory*.
Contributed to various research efforts in machine learning, deep learning, computer vision, and high dimensional data analysis.
- 4/16 - 10/16 **Postdoctoral Researcher**, *IBM Research - Almaden*, San Jose, CA.
Contributing to the image analytics aspect of the medical sieve grand challenge, which is a long-term exploratory project to build a next generation cognitive assistant with advanced analytical knowledge to assist in radiology and cardiology. [[Group webpage](#)]
- Summer 2015 **Research Scholar**, *Lawrence Livermore National Laboratory*, Livermore, CA.
Efficient lung nodule detection and segmentation from CT scans using 3D CNNs.
Mentors: Dr. Peer-Timo Bremer and Dr. Jayaram J. Thiagarajan.
- Summer 2014 **Intern**, *Dropcam Inc. (now part of Nest Labs/Google)*, San Francisco, CA.
Explored methods to estimate accuracy of human detectors with minimal supervision.
Mentor: Dr. Jason Laska.

- Summer 2013 **Research Intern**, *Intuitive Surgical Inc.*, Sunnyvale, CA.
Worked on developing, and testing new sensor processing and fusion algorithms for robust real-time surgical robotic navigation.
Mentor: Dr. Vincent Duindam.
- Summer 2009 **Undergraduate Intern**, *Institut polytechnique de Grenoble (INPG)*, France.
Developed an interface to study the spatio-temporal model of the retina and understand how patients with macular degeneration performed image categorization.

Selected Publications

For an exhaustive list please see my [Google Scholar page](#)

1. T. Gokhale, **R. Anirudh**, B. Kailkhura, J.J. Thiagarajan, C. Baral, Y. Yang, *Attribute-guided Adversarial Training for Robustness to Natural Perturbations* in AAAI 2021. [\[paper\]](#), Feb 2021.
2. **R. Anirudh**, S. Lohit, P. Turaga, *Generative Patch Priors for Practical Compressive Image Recovery* in WACV **Best Paper Honorable Mention** [\[paper\]](#), Jan 2021.
3. J. J. Thiagarajan, B. Venkatesh, **R. Anirudh**, P.T. Bremer, J. Gaffney, G. Anderson, B.K. Spears, *Designing Accurate Emulators for Scientific Processes using Calibration-Driven Deep Models* in Nature Communications [\[paper\]](#), Oct 2020.
4. S. Liu, **R. Anirudh**, J.J. Thiagarajan, P.T. Bremer, *Uncovering Interpretable Relationships in High-Dimensional Scientific Data Through Function Preserving Projections* in Machine Learning: Science and Technology (MLST) [\[paper\]](#), Sep 2020.
5. **R. Anirudh**, J.J. Thiagarajan, P.T. Bremer, B. K. Spears, *Improved Surrogates in Inertial Confinement Fusion with Manifold and Cycle Consistencies* in Proc. of National Academy of Sciences (PNAS) [\[paper\]](#), Apr 2020.
6. **R. Anirudh**, J.J. Thiagarajan, B. Kailkhura, P.T. Bremer, *MimicGAN: Robust Projection onto Image Manifolds with Corruption Mimicking* in Intl. Journal of Computer Vision (IJCV) [\[paper\]](#), Feb 2020.
7. **R. Anirudh**, H. Kim, J.J. Thiagarajan, K.A. Mohan, K. Champley, T. Bremer, *Lose The Views: Limited Angle CT Reconstruction via Implicit Sinogram Completion*. Spotlight ($\sim 10\%$ acceptance rate) in IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2018.
8. **R. Anirudh**, J. Su, A. Srivastava and P. Turaga, *Elastic Functional Coding of Riemannian Trajectories*, in IEEE Transactions on Pattern Analysis and Machine Intelligence (PAMI), 2017.
9. **R. Anirudh** and P. Turaga, *Geometry-based Adaptive Symbolic Approximation for Fast Sequence Matching on Manifolds.*, International Journal of Computer Vision (IJCV), 2016.
10. **R. Anirudh**, J. Su, A. Srivastava and P. Turaga, *Elastic Functional Coding of Human Actions: From Vector-Fields to Latent Variables*, in IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2015.
11. **R. Anirudh** and P. Turaga, *Interactively Test Driving an Object Detector: Estimating Performance on Unlabeled Data*, IEEE Winter Conference on Applications of Computer Vision (WACV), 2014.

Grant Awards

- PI on Grant to Curate LLNL's Data Ecosystem for \$55K/year (Oct 2019 - Sep 2020)
- Co-PI on LDRD Research Grant on Neuroscience & ML for \$500K/year (promoted to PI for FY21) (Oct 2018 - Sep 2021)
- Co-PI on LDRD Research Grant on ML for ECG Modeling for \$280K/year (Oct 2017 - Sep 2019)

Skills

Programming C++, Java, Python, Matlab

Packages OpenCV (computer vision), basic OpenGL, data analysis packages in Python (scikit learn, pandas), Deep learning (Pytorch, Tensorflow, Keras)

Honors & Awards

- WACV 2021 Best Paper Honorable Mention Award for Generative Patch Priors (Jan 2021)
- Recognized as a top reviewer for ICML 2020. (Sept 2020)
- Part of GOLD award winning team at LLNL for our COVID-19 modeling efforts. (Aug 2020)
- Invited to participate in the Dagstuhl seminar on Interpretability in ML [\[Link\]](#) (Nov 2019)
- Placed 2/50 in LLNL's Annual Research Slam Competition with a prize of \$3000. (Oct 2018)
- Awarded Outstanding Reviewer for Journal Computer Methods in Bio-medicine. (Aug 2018)
- My work was profiled by LLNL [\[Link\]](#) (Aug 2018)
- Featured on LLNL's Data Science Institute Spotlight [\[Link\]](#) (July 2018)
- NVIDIA's AI blog featured our paper on GANs for Inverse Problems [\[Link to Article\]](#) (June 2018)
- Invited to perform Academic Program Review at Arizona State University. (Apr 2018)
- Awarded Outstanding Reviewer for Journal Pattern Recognition. (Oct 2017)
- Travel grant of \$350 to attend DCC 2015. (Apr 2015)
- Co-Chair of the annual tech symposium with a budget of \$50K. (Oct 2009)
- Head of IEEE chapter with a 300+ strong student body. (July 2009 - April 2010)
- Gold medal for being among the top 0.1% in India in Chemistry by CBSE (June 2006)

Service

- Co-Organizer of DiffCVML Workshop at CVPR 2021. [\[paper\]](#)
- Session Chair at Asilomar 2020
- Program Committee: ICLR, NeurIPS, CVPR, ICCV, AAAI, ICML, ECCV
- Journal Reviewer: IEEE Transactions on Medical Imaging, ACM-Computing Surveys, Pattern Recognition Letters, Pattern Recognition, Computer Vision and Image Understanding, IEEE Trans. Image Processing.
- Student Volunteer for ACM Multimedia 2011, Scottsdale, AZ.