DR. ANOOP CHERIAN

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QUALIFICATIONS

PhD in Computer Science
University of Minnesota, Minneapolis, USA — 2010 - 2013
Thesis title: "*Similarity Search in Visual Data"*
Adviser**:** Prof. Nikolaos Papanikolopoulos

M.S. in Computer Science — 2007 - 2010
University of Minnesota, Minneapolis, USA
Thesis title: *"Altitude Estimation of a Miniature Helicopter using a Single Onboard Camera"*
Adviser: Prof. Nikolaos Papanikolopoulos

B. Tech. (Honors) in Computer Science and Engineering — 1998 - 2002
National Institute of Technology, Kozhikode, Kerala, India

AWARDS AND HONOURS

Outstanding Reviewer Award, European Conference of Computer Vision, Amsterdam, 2016
Best Student Paper Award, International Conference on Image Processing, Orlando, 2012
Best Poster Award, Minnesota Supercomputing Institute Research Exhibition, Minneapolis, 2012
Academic Proficiency Award (2nd Rank in CSE), Regional Engineering College, India, 2002

Research Metrics (Google Scholar)
H-index = 13, i10-index=15, #citations=515 (on 18th April 2017)

ACADEMIC AND INDUSTRIAL POSITIONS

Research Fellow — 2015 - Present
Australian National University, Australia

Postdoctoral Researcher — 2012 – 2015
INRIA, Rhone-Alpes, France

Research Intern — 2010
Max Planck Institute for Biological Cybernetics, Germany

Research Assistant — 2007 – 2012
University of Minnesota, USA

Software Design Engineer — 2005 – 2007
Microsoft Corporation, India

Research Engineer — 2002 – 2005
Center for Development of Telematics, India

PATENTS AND SCIENTIFIC PUBLICATIONS

Invited Book Chapters

1) **A. Cherian** and S. Sra, "Positive Definite Matrices: Data Representation and Application to Computer Vision", *Algorithmic Advances in Riemannian Geometry and Applications - For Machine Learning, Computer Vision, Statistics, and Optimization*, Springer, 2016 (in Press)

Patents

2) P. Stanitsas, **A. Cherian**, V. Morellas, N. Papanikolopoulos, and A. Truskinovsky, "Computer Vision for Cancerous Tissue Recognition", US Patent (filed on 12/02/2016)

Journal Articles

3) **A. Cherian** and S. Gould, "Second-order Temporal Pooling for Action Recognition, International Journal of Computer Vision (IJCV), (under review, submitted April 2017)

4) N. Zhong, W. Yang, **A. Cherian**, and X. Yang, "Unsupervised Classification of Polarimetric SAR Images via Riemannian Sparse Coding", *IEEE Transactions on Geoscience and Remote Sensing*, March, 2017 (accepted with minor revisions)

5) **A. Cherian** and S. Sra, "Riemannian Dictionary Learning and Sparse Coding for Positive Definite Matrices", *IEEE Transactions on Neural Networks and Learning Systems* (**TNNLS**), 2016 (IF: 4.84)

6) **A. Cherian**, V. Morellas, and N. Papanikolopoulos, "Bayesian Nonparametric Clustering of Positive Definite Tensors", *IEEE Transactions on Pattern Analysis and Machine Intelligence* (**TPAMI**), PP (99), 1—1, IEEE, 2015 (IF: 5.781) (**Ranked #1 journal in Computer Science**)

7) J. Andersh, **A. Cherian**, B. Mettler, and N. Papanikolopoulos, "A Vision based Ensemble Approach to Velocity Estimation for Miniature Rotorcraft", *Autonomous Robots*, 39(2), 123—138, 2015 (IF: 2.066)

8) **A. Cherian**, S. Sra, A. Banerjee, and N. Papanikolopoulos, "Jensen-Bregman Logdet Divergence for Efficient Distance Computations on Positive Definite Matrices", *IEEE Transactions on Pattern Analysis and Machine Intelligence* (**TPAMI**), 35(9), 2161—2174, 2013 (IF: 5.781) (**Ranked #1 journal in Computer Science**)

9) **A. Cherian**, V. Morellas, and N. Papanikolopoulos, "Efficient Similarity Search via Robust Sparse Hashing", *IEEE Transactions on Image Processing*, 23(8), 3646—3655, 2014 (IF: 3.625)

10) G. Somasundaram, **A. Cherian**, V. Morellas, and N. Papanikolopoulos, **"**Action Recognition Using Global Spatio-Temporal Features Derived from Sparse Representations", *Computer Vision and Image Understanding*, 123:1-13, 2013 (IF: 1.540)

Conference Articles

11) **A. Cherian**, B. Fernando, M. Harandi, and S. Gould, "Generalized Rank Pooling for Action Recognition", *Computer Vision and Pattern Recognition* (**CVPR**), (to appear)

12) R. SantaCruz*****, B. Fernando, **A. Cherian**, and S. Gould, "DeepPermNet: Visual Permutation Learning", *Computer Vision and Pattern Recognition* (**CVPR**), (to appear)

13) **A. Cherian**, P. Koniusz, and S. Gould, "Higher-order Pooling on CNN Features via Kernel Linearization for Action Recognition*", Winter Conference on Applications of Computer Vision* (**WACV**), 2017

14) J. Wang*, **A. Cherian**, and F. Porikli, "Ordered Pooling of Optical Flow Sequences for Action Recognition", *Winter Conference on Applications of Computer Vision* (**WACV**), 2017

15) P. Koniusz, **A. Cherian**, and F. Porikli, "Tensor Representations Using Kernel Linearization for Action Recognition from 3D Skeletons", *European Conference on Computer Vision* (**ECCV**), 2016, Springer (**Top-tier conference in Computer Vision**)

16) P. Koniusz and **A. Cherian**, "Sparse Coding for Third-order Supersymmetric Tensors with Application to Texture Recognition", *Proceedings of the IEEE International Conference on Computer Vision and Pattern Recognition (**CVPR**)*, 2016, IEEE (**top 10% of accepted papers**) (**Rank #1 conference in Computer Vision**)

17) Y. Wen, N. Zhong, X. Yang, and **A. Cherian**, "Riemannian Sparse Coding for Classification of PolSAR Images", *IEEE International Geoscience and Remote Sensing Symposium (**IGARSS**)*, 2016, IEEE **(Oral Presentation)**

18) P.Stanitsas*, **A. Cherian**, V. Morellas, and N. Papanikolopoulos, "Active Constrained Clustering via Non-Iterative Uncertainty Sampling", *Proceedings of the IEEE International Conference on Intelligent Robots and Systems (**IROS**)*, 2016, IEEE (**Top-tier conference in Robotics**)

19) P. Stanitsas*, **A. Cherian**, X. Li, A. Truskinovsky, V. Morellas, and N. Papanikolopoulos, "Evaluation of Feature Descriptors for Cancerous Tissue Recognition", IEEE *International Conference on Pattern Recognition* (**ICPR**), 2016, IEEE **(oral presentation)**

20) **A. Cherian**, J. Mairal, K. Alahari, and C. Schmid, "Mixing Body-part Sequences for Human Pose Estimation", *Proceedings of the IEEE International Conference on Computer Vision and Pattern Recognition **(CVPR)***, 2361—(**Rank #1 conference in Computer Vision)**

21) **A. Cherian**, "Nearest Neighbors Using Compact Sparse Codes", *Proceedings of the 31st International Conference on Machine Learning **(ICML)***, 1053—1061, 2014 (**Top-tier conference in Machine Learning**)

22) **A. Cherian** and S. Sra, “Riemannian Sparse coding of Positive Definite Matrices”, *Proceedings of the European Conference on Computer Vision **(ECCV)***, 299—314, 2014, Springer International Publishing (**Top-tier conference in Computer Vision**)

23) **A. Cherian**, V. Morellas, and N. Papanikolopoulos, “Robust Sparse Hashing”, Proceedings of the International Conference on Image Processing (**ICIP**), 2417—2421, 2012, IEEE **(Best student paper award) (Top-tier conference in Image Processing)**

24) R. Sivalingam, **A. Cherian**, V. Morellas, N. Papanikolopoulos, G. Sapiro, et al., “A Multi-Sensor Visual Tracking System for Behavior Monitoring of At-Risk Children”, *Proceedings of the IEEE International Conference on Robotics and Automation (**ICRA**)*, 1345—1350, 2012, IEEE (**Rank #1 conference in Robotics**)

25) D. Fehr, **A. Cherian**, R. Sivalingam, S. Nikolay, V. Morellas, and N. Papanikolopoulos, “Compact Covariance Descriptors in 3D Point Clouds for Object Recognition”, *Proceedings of the IEEE International Conference on Robotics and Automation (**ICRA**)*, 1793—1798, 2012, IEEE (**Rank #1 conference in Robotics)**

26) **A. Cherian**, S. Sra, A. Banerjee, and N. Papanikolopoulos, “Efficient Similarity Search for Covariance Matrices via the Jensen-Bregman Logdet Divergence”, *Proceedings of the IEEE International Conference on Computer Vision **(ICCV)***, 2399—2406, 2011, IEEE **(Spotlight Presentation) (Top-Tier conference in Computer Vision)**

27) **A. Cherian**, V. Morellas, N. Papanikolopoulos, and S. Bedros, **“**Dirichlet Process Mixture Models on Symmetric Positive Definite Matrices for Appearance Clustering in Video Surveillance Applications”, *Proceedings of the IEEE International Conference on Computer Vision and Pattern Recognition **(CVPR)***, 3417—3424, 2011, IEEE (**Rank #1 conference in Computer Vision**)

28) S. Sra and **A. Cherian**, “Generalized Dictionary Learning for Symmetric Positive Definite Matrices with Application to Nearest Neighbor Retrieval”, *Machine Learning and Knowledge Discovery in Database* **(ECML)**, 318—332, 2011, Springer Berlin Heidelberg (**Top-tier conference in Machine Learning**)

29) **A. Cherian**, S. Sra, and N. Papanikolopoulos, “Denoising Sparse Noise via Online Dictionary Learning”, *Proceedings of the IEEE International Conference on Accoustics, Speech and Signal Processing (**ICASSP**)*, 2060—2063, 2011, IEEE

30) **A. Cherian**, V. Morellas, and N. Papanikolopoulos, “Approximate Nearest Neighbors via Dictionary Learning”, *SPIE Defense, Security, and Sensing*, 80581M-80581M, 2011, International Society for Optics and Photonics **(Oral Presentation)**

31) **A. Cherian**, V. Morellas and N. Papanikolopoulos, “Efficient Similarity Search via Sparse Coding”, *Technical Report, Department of Computer Science and Engineering*, University of Minnesota, 2011

32) **A. Cherian**, J. Andersh, V. Morellas, B. Mettler and N. Papanikolopoulos, "Motion Estimation of a Miniature Helicopter using a Single Onboard Camera", *American Control Conference (**ACC**)*, 4456—4461, 2010, IEEE

33) **A. Cherian**, J. Andersh, V. Morellas, N. Papanikolopoulos, and B. Mettler, "Autonomous Altitude Estimation of a UAV using a Single Onboard Camera", *Proceedings of the IEEE International Conference on Intelligent Robots and Systems (**IROS**)*, 3900—3905, 2009, IEEE (**Top-tier conference in Robotics**)

34) **A. Cherian**, V. Morellas, and N. Papanikolopoulos, "Accurate 3D Ground Plane Estimation from a Single Image", *Proceedings of the IEEE International Conference on Robotics and Automation (**ICRA**)*, 2243—2249, 2009, IEEE (**Rank #1 conference in Robotics**)

Non Peer-reviewed Articles / Articles Currently Under Review

35) S. Gould, B. Fernando, **A. Cherian**, P. Anderson, R. Santa Cruz, and E. Guo, "On Differentiating Parameterized Argmin and Argmax with Application to Bi-level Optimization", *CoRR arxiv:1607.05447*, 2016

36) J. Wang*, **A. Cherian**, S. Gould and F. Porikli, "Action Recognition Using Classifier Decision Boundaries", *arXiv preprint arXiv:1704.01716* (2017)

37) P. Stanitsas*, **A. Cherian**, A. Truskinovsky, V. Morellas, and N. Papanikolopoulos, "Active Convolutional Neural Networks for Cancerous Tissue Recognition", *IEEE Conference on Image Processing*, submitted in Feb. 2017

38) C. Peng*, H. Li, **A. Cherian**, and H. Yao, "Part-based Fine-grained Bird Image Retrieval Respecting Species Correlation", *IEEE Conference on Image Processing*, submitted in Feb. 2017

* students supervised by me when writing the respective papers.

SCIENTIFIC LEADERSHIP ACTIVITES

1. With P. Koniusz and F. Porikli, "Workshop on Tensor Methods in Computer Vision", *Computer Vision and Pattern Recognition* (**CVPR**), July 2017, http://users.cecs.anu.edu.au/~koniusz/tensors-cvpr17/

2. With R. Mahony, "Robotic Vision Summer School", 5-day International Summer School, Australia, March, 2017, http://roboticvision.org/events/rvss-summer-school/

3. With J. Leitner and S. Shirazi, "Deep Learning and its Applications in Vision and Robotics", *Joint workshop with Australian Conference on Robotic Vision* (**ACRA**) and *Conference on Artificial Intelligence* (**AI**), Dec. 2015, http://juxi.net/workshop/deeplearning-applications-vision-robotics-2015/

SCIENTIFIC TALKS AND POSTER PRESENTATIONS

1) "Fine-grained Action Representations for Human-Robot Interactions", *RoboVis*, Melbourne, Sept, 2016
2) "Tensor Sparse Representations for Fine-grained Action Recognition", *Mitsubishi Electric Research Lab*, August, 2016
3) "Tensor Representations for Fine-grained Action Recognition", CSAIL, *Massachusetts Institute of Technology (MIT)*, July, 2016
4) "Tensor Representations for Fine-grained Action Recognition", *University of Minnesota*, Minneapolis, July, 2016
5) "Human Pose Estimation Using Recombination of Parts", *RoboVis*, Adelaide, Australia, June 2015
6) "Pattern mining in visual data", *Siemens Corporate Research*, Princeton, USA, July, 2014
7) "Mixing Body-Part Sequences for Human Pose Estimation", Microsoft Research-INRIA joint center, Paris, May 2014
8) "Pattern Mining in Visual data – Applications to Human Pose Estimation and Visual Content Search", *Yahoo Labs*, Bangalore, April 2014
9) "Human Pose Estimation via Structured Regularization", *Microsoft Research-INRIA Joint Center*, Paris, Spring, 2013
10) "Large Scale Image Search via Sparse Coding", *Minnesota Supercomputing Institute Research Exhibition*, April 2012 (**Best Poster Award** - out of 44 posters from multiple scientific disciplines)
11) "Robust Sparse Hashing", *Intl. Conference on Image Processing (ICIP),* Florida, Orlando, 2012
12) "State Estimation of a Miniature Helicopter combining IMU, Gyros and Vision", *Symposium on Safety Security and Rescue Research*, DTC, University of Minnesota, Nov. 2011
13) "Sparse Feature Descriptors for Fast Information Retrieval", *Symposium on Safety Security and Rescue Research*, University of Pennsylvania, May 2011
14) **"**Approximate Nearest Neighbors via Dictionary Learning", Invited Talk, *Computer vision Lectures*, University of Minnesota, 2011
15) "Approximate Nearest Neighbors via Dictionary Learning", Oral Presentation, *SPIE Conference*, Florida, 2011
16) "Efficient Similarity Search for Covariance Matrices via the Jensen-Bregman Logdet Divergence", *Spotlight Presentations, ICCV*, Barcelona, 2011
17) **"**Machine Learning in Computer Vision - A Tutorial", *Safety Security Rescue Research Center (SSR-RC)*, Digital Technology Center, University of Minnesota, 2009
18) **"**Altitude Estimation of a UAV using a Single Onboard Camera", *Intl. Conf. on Intelligent Robot Systems (IROS)*, St. Louis, 2009

STUDENT SUPERVISING / IN PHD STUDENT PANEL

1. Mr. P. Stanitsas, PhD Student (with Prof. N. Papanikolopoulos), UMN
2. Mr. Rodrigo SantaCruz, PhD Student, ANU (with Prof. Stephen Gould)
3. Mr. Jue Wang, PhD Student, ANU/Data61 (with Prof. Fatih Porikli)
4. Mr. Cheng Peng, Visiting PhD Student (with Prof. Hongdong Li)

TEACHING

1. Supervising undergraduate student Mr. Sam Toyer, ANU, 2015-Present
2. Supervising undergraduate student Mr. Tengda Han, ANU, 2016
3. B.Sc. Thesis panel for undergraduate student Mr. Chang Li, ANU, 2016
4. B.Sc. Thesis panel for undergraduate student Mr. Kelji Li, ANU, 2016
5. B.Sc. Thesis panel for undergraduate student Mr. Abbe Wade, ANU, 2016
6. Teaching Assistant for Course: Artificial Intelligence, University of Minnesota, 2010

INVITED PROGRAM COMMITTEE MEMBERSHIPS/JOURNAL REVIEWING

International Conferences in Compute Vision, Machine Learning and Robotics:

Computer Vision and Pattern Recognition (CVPR), since 2011-
European Conference on Computer Vision (ECCV), since 2012-
International Conference on Computer Vision (ICCV), since 2011-
Asian Conference on Computer Vision (ACCV), since 2016-
Winter Conference on Applications of Computer Vision (WACV), since 2016-
Artificial Intelligence and Statistics (AISTATS), since 2015-
International Conference on Machine Learning (ICML), since 2015-
Advances in Neural Information Processing Systems (NIPS), since 2015-
International Conference on Robotics and Automation (ICRA), since 2009-
International Conference Robotics and Systems (IROS), since 2009-

Journals in Computer Vision, Machine Learning, and Robotics:

Journal of Machine Learning Research (JMLR), 2014, 2016
IEEE Trans. Pattern Analysis and Machine Intelligence (PAMI), 2015
International Journal of Computer Vision (IJCV), 2016
IEEE Trans. Image Processing (TIP), 2014, 2015, 2016
IEEE Trans. On Signal Processing (TSP, 2016
IEEE Trans. Intelligent Transportation Systems (TITS), 2014, 2015
IEEE Trans. Neural Networks and Learning Systems (TNNLS), 2015, 2016
IEEE Trans. Automation and Engg. (TASE), 2014
IEEE Trans. Multimedia, 2015
Signal Processing Letters, (SPL) 2015, 2016
Journal of Intelligent Robotics, (JINT) 2009-
Optimization Methods and Software (OMS), 2015