

dr. ir. Sundeep Prabhakar Chepuri

Curriculum Vitae

Contact

Assistant Professor
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Google Scholar: <https://scholar.google.com/citations?user=Gu8FjdWAAAAJ>

Personal data

Year/Place of birth 02 April 1986, Bangalore, India
Nationality Indian
Marital status Married

Education

9/2011-9/2015 *Ph.D. (cum laude)*, Delft University of Technology
Delft, The Netherlands. Graduation date: 25th January 2016.

Thesis: *Sparse Sensing for Statistical Inference: Theory, Algorithms, and Applications*

Advisors: Prof. Geert Leus and Prof. Alle-Jan van der Veen

Committee members: Prof. Georgios B. Giannakis, Prof. Abdelhak Zoubir, Prof. Alexander Bertrand, Prof. Jean-Paul Linnartz, Prof. Inald Lagendijk.

8/2009-7/2011 *M.Sc. (cum laude)*, *Electrical Engineering*, Delft University of Technology
Delft, The Netherlands.

Thesis: *Wideband spectrum sensing techniques for wireless sensors*

Advisors: Prof. Geert Leus and dr. Ruben de Fransisco

8/2003-7/2007 *B.E. (first class with distinction)*, *Telecommunication Engineering*, PES Institute of Technology, Bangalore, India.

Awards and Honors

Best student paper award (3 out of ~2500 submissions) - IEEE ICASSP 2015, Australia. ICASSP is a top flagship signal processing conference.
Finalist —Best student paper award contest at IEEE SAM 2014, Spain (co-author with Keke Hu).
Distinction award scholarship (2003-2007), PES Institute of Technology, India.

Employment

- 12/2018–Present Assistant Professor, Department of ECE,
Indian Institute of Science, India
- 9/2015–12/2018 Postdoctoral researcher, Circuits and Systems group,
Delft University of Technology, The Netherlands
- 9/2011–9/2015 Researcher (Ph.D. candidate)
Delft University of Technology, The Netherlands
- 7/2010–7/2011 Research Intern, Holst center/IMEC-NL
Eindhoven, The Netherlands
- 7/2007–8/2009 Engineer,
Robert Bosch Limited, Bangalore, India

Research visits

- 9/2018-10/2018 Visiting Lecturer, Dept. of Signal Processing and Acoustics, Aalto University, Finland.
- 2/2015–3/2015 Visiting Researcher, Signal Processing in Networking and Communications Group, Uni-
versity of Minnesota. Hosted by Prof. Georgios B. Giannakis.

Editorships and other activities

- 2016–present Associate Editor, EURASIP Journal on Advances in Signal Processing.
- 2017–present Associate Member, IEEE Signal Processing Society's Sensor Array and Multichannel
Technical Committee (SAM-TC).
- 2019–present Member (elected), EURASIP's Signal Processing for Multisensor Systems Special Area
Team (SPMuS-SAT).

Invited talks

- 9/2017 Graph Sampling for Covariance Estimation, TCS Innovation labs, Bangalore, India.
- 9/2017 Graph Sampling for Covariance Estimation, Dept. of ECE, Indian Inst. of Science,
Bangalore, India.
- 2/2016 Sparse Sensing for Statistical Inference, Dept. of ECE, Indian Inst. of Science, Banga-
lore, India.
- 12/2015 Sparse Sensing for Statistical Inference, MS3, Delft Univ. of Tech., Netherlands.
- 11/2015 Sparse Sensing for Statistical Inference, CISP, Georgia Institute of Tech., Atlanta, USA.
- 2/2015 Sparse Sensing for Statistical Inference, SPINCOM, Univ. of Minnesota, Minnesota,
USA.
- 9/2012 Wireless Clock Synchronization and Localization, Dept. of ECE, Indian Inst. of Science,
Bangalore, India.

Tutorials

- 7/2018 Graph Sampling for Signal and Covariance Estimation, IEEE Sensor Array and Multi-
channel Signal Processing Workshop (SAM 2018), Sheffield, UK.
- 8/2016 Sparse Sensing for Statistical Inference, European Signal Processing Conference (EU-
SIPCO 2016), Budapest, Hungary.

5/2016

Sparse Sensing for Statistical Inference, IEEE Sensor Array and Multichannel Signal Processing Workshop (SAM 2016), Rio de Janeiro, Brazil.

Conference organization

1. Technical Co-chair: Graph Signal Processing symposium, IEEE Global Conference on Signal and Information Processing 2018 (GlobalSIP 2018).
2. Member of Technical Program Committee: Graph Signal Processing symposium, IEEE Global Conference on Signal and Information Processing (GlobalSIP 2016, GlobalSIP 2017), European Signal Processing Conference (EUSIPCO 2017, EUSIPCO 2018).
3. Special session co-organizer (with A. Marques), *Graph Topology Inference*, at IEEE Data Science Workshop 2018, Lausanne, Switzerland, Jun. 2018.
4. Special session co-organizer (with G. Leus), *Sparsity in Sampling and Inference*, at IEEE CAMSAP 2017, Curaçao, Dutch Antilles, Dec. 2017.
5. Special session co-organizer (with G. Leus), *Sparse Sampling for Data Analytics*, at ASILOMAR 2016, California, USA, Nov. 2016.
6. Special session co-organizer (with G. Leus), *Designing Sparse Sensing Structures*, at ASILOMAR 2015, California, USA, Nov. 2015.

Teaching

1. Applied convex optimization (teacher, with A. Simonetto), 2015-2016, (teacher, with G. Leus) 2016-2017, 2017-2018.
2. Estimation and detection (teacher, with R. Hendriks), 2016-2017, 2017-2018.
3. Signal processing for communications, (teaching assistant) 2014-2015, 2015-2016, 2016-2017.
4. Statistical digital signal processing (teaching assistant), 2015-2016, 2016-2017, 2017-2018.
5. EE Bachelor project: EPO-4 Indoor Localization (lab instructor, with A.-J. van der Veen), 2016, 2017.

Supervision

1. Guillermo Ortiz Jimenez, ongoing (co-advisor, MSc thesis: Graph Neural Networks)
2. Shilpa Rao, Jul. 2015 (co-advisor, MSc thesis (*cum laude*): Sparse Vector Sensor Arrays)
3. Keke Hu, Jan. 2014 (co-advisor, MSc thesis: Compressive Near-field Localization)

Reviewing

IEEE Transactions (Signal Processing, Communications, Wireless Communications, Sensors), IEEE Letters (Signal Processing, Communications), EURASIP Journal on Advances in Signal Processing, Elsevier Signal Processing, ICASSP, GLOBALSIP, EUSIPCO, SAM, CAMSAP, SSP, among others.

Research Experience

Algorithms, analysis, and application of statistical and array signal processing, linear algebra, and mathematical optimization tools to problems in sensor networks, wireless communications, and data analytics.

Experience and background include mathematical signal processing; statistical inference and learning; graph signal processing, sparse sampling; compressed sensing; localization and wireless synchronization; array processing; wireless communications; and spectrum sensing.

List of Publications

Total number of publications: 1 monograph, 1 book chapter, 15 (peer-reviewed) and 1 (under review) journal papers, and 40 (peer-reviewed) conference papers.

Based on Google Scholar, I have an h-index 14 with about 710 citations.

Books

- [1] S.P. Chepuri and G. Leus. Sparse sensing for statistical inference. *Foundations and Trends in Signal Processing*, 9(3):233–368, Dec. 2016.

Book Chapters

- [1] S. Segarra, S.P. Chepuri, A. G. Marques, and G. Leus. Statistical graph signal processing: Stationarity and spectral estimation. In P. M. Djuric and C. Richard (Ed.), *Cooperative and graph signal processing: Principles and applications*, Elsevier, Sept. 2018.

Journal Papers

- [1] G. Ortiz-Jimnez, M.Coutino, S.P. Chepuri, and G. Leus. Sparse sampling for inverse problems with tensors. *IEEE Tran. on Signal Proc. (under review)*, Jun. 2018.
- [2] E. Tohidi, M.Coutino, S.P. Chepuri, H. Behroozi, and M.M. Nayebi and G. Leus. Sparse antenna and pulse placement for colocated MIMO radar. *IEEE Tran. on Signal Proc.*, Dec. 2019.
- [3] S.P. Chepuri. Factor analysis from quadratic sampling. *IEEE Sig. Proc. Letters*, 25(1):65–69, Jan. 2018.
- [4] M.Coutino, S.P. Chepuri, and G. Leus. Near-optimal sparse sensing for Gaussian detection with correlated observations. *IEEE Tran. on Signal Proc.*, 66(15):4025–4039, Jun. 2018.
- [5] J. Zhang, S.P. Chepuri, R. C. Hendriks, and R. Heusdens. Microphone subset selection for MVDR beamformer based noise reduction. *IEEE/ACM Trans. on Audio, Speech and Language Proc.*, 26(3):550–563, Mar. 2018.
- [6] J. Han, S.P. Chepuri, Q. Zhang, and G. Leus. Iterative per-vector equalization for orthogonal signal-division multiplexing over time-varying underwater acoustic channels. *IEEE Journ. of Oceanic Engineering (to appear)*, Nov. 2016.
- [7] S.P. Chepuri and G. Leus. Graph sampling for covariance estimation. *IEEE Jour. on Sel. Topics in Sig. Proc. and IEEE Trans. on Sig. and Info. Proc. over Networks, joint special issue on Graph Signal Processing*, 3(3):451 – 466, Sept. 2017.
- [8] S. Liu, S.P. Chepuri, M. Fardad, E. Masazade, G. Leus, and P.K. Varshney. Sensor selection for estimation with correlated measurement noise. *IEEE Trans. on Sig. Proc.*, 64(13):3509 – 3522, Jul. 2016.

- [9] G. Kail, S.P. Chepuri, and G. Leus. Robust censoring using Metropolis-Hastings sampling. *IEEE Journ. of Sel. Topics in Sig. Proc.*, 10(2):270–283, Mar. 2016.
- [10] S. P. Chepuri and G. Leus. Sparse sensing for distributed detection. *IEEE Trans. Sig. Proc.*, 16(6):1446–1460, Mar. 2016.
- [11] S. Khademi, S.P. Chepuri, Z. Irahhtauten, G.J.M Janssen, and A.-J. van der Veen. 60 GHz wireless link within metal enclosures: Channel measurements and system analysis. *IEEE Trans. on Wireless Communications*, 14(9):5098–5110, Sep. 2015.
- [12] S.P. Chepuri and G. Leus. Continuous sensor placement. *IEEE Sig. Proc. Letters*, 22(5):544–548, May 2015.
- [13] S.P. Chepuri and G. Leus. Sparsity-promoting sensor selection for non-linear measurement models. *IEEE Trans. Sig. Proc.*, 63(3):684–698, Sep. 2015.
- [14] S.P. Chepuri, G. Leus, and A.-J. van der Veen. Rigid body localization using sensor networks. *IEEE Trans. Sig. Proc.*, 62(18):4911 – 4924, Sep. 2014.
- [15] S.P. Chepuri, R.T. Rajan, G. Leus, and A.J. van der Veen. Joint clock synchronization and ranging: Asymmetrical time-stamping and passive listening. *IEEE Sig. Proc. Letters*, 20(1):51–54, Jan. 2013.
- [16] S. Maleki, S.P. Chepuri, and G. Leus. Optimization of hard fusion based spectrum sensing for energy-constrained cognitive radio networks. *Physical Communication*, June 2012. ISSN 1874-4907, DOI 10.1016/j.phycom.2012.07.003.

Conference Papers

- [1] G. Ortiz-Jimnez, M. Coutino, S. P. Chepuri, and G. Leus. Sampling and reconstruction of signals on product graphs. In *Proc. of the 6th IEEE Global Conference on Signal and Information Processing (GlobalSIP)*, Anaheim, USA, Nov. 2018.
- [2] T. Aittomki, S.P. Chepuri, and V. Koivunen. Dynamic transmit power allocation for distributed mimo radar target detection. In *Proc. of the 10th IEEE Sensor Array and Multichannel Signal Processing Workshop (SAM)*, Sheffield, United Kingdom, July 2018.
- [3] M.C. Minguez, S.P. Chepuri, and G. Leus. Sparsest network support estimation: A submodular approach. In *Proc. of the 1st IEEE Data Science Workshop (DSW)*, Lausanne, Switzerland, July 2018.
- [4] S.P. Chepuri, M. Coutino, A. G. Marques, and G. Leus. Distributed analytical graph identification. In *Proc. of the International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, Alberta, Canada, Apr. 2018.
- [5] S.P. Chepuri, Y.C. Eldar, and G. Leus. Graph sampling with and without input priors. In *Proc. of the International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, Alberta, Canada, Apr. 2018.
- [6] K.N. Ramamohan, S.P. Chepuri, D.F. Comesana, G.C. Pousa, and G. Leus. Blind calibration for acoustic vector sensor arrays. In *Proc. of the International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, Alberta, Canada, Apr. 2018.
- [7] M. Coutino, S.P. Chepuri, and G. Leus. Subset selection for kernel-based signal reconstruction. In *Proc. of the International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, Alberta, Canada, Apr. 2018.
- [8] K.R. Ramamohan, M. Coutino, S.P. Chepuri, D.F. Comesana, and G. Leus. DOA estimation and beamforming using spatially under-sampled AVS arrays. In *Proc. of the IEEE 7th International*

Workshop on Computational Advances in Multi-Sensor Adaptive Processing (CAMSAP), Curacao, Dutch Antilles, Dec. 2017.

- [9] M. Coutino, S.P. Chepuri, and G. Leus. Sparse sensing for composite matched subspace detection. In *Proc. of the IEEE 7th International Workshop on Computational Advances in Multi-Sensor Adaptive Processing (CAMSAP)*, Curacao, Dutch Antilles, Dec. 2017.
- [10] O.S. Bushnaq, S.P. Chepuri, T.Y. Al-Naffouri, and G. Leus. Joint sensor placement and power rating selection in energy harvesting wireless sensor networks. In *Proc. of the 25th European Signal Processing Conference (EUSIPCO)*, Kos, Greece, Aug. 2017.
- [11] M. Coutino, S.P. Chepuri, and G. Leus. Near-optimal greedy sensor selection for MVDR beamforming with modular budget constraint. In *Proc. of the 25th European Signal Processing Conference (EUSIPCO)*, Kos, Greece, Aug. 2017.
- [12] S.P. Chepuri, S. Liu, G. Leus, and A. Hero. Learning sparse graphs under smoothness prior. In *Proc. of the 42th International Conference on Acoustics, Speech, and Signal Processing (ICASSP 2017)*, New Orleans, USA, Mar. 2017.
- [13] S. Liu, S.P. Chepuri, G. Leus, and A. Hero. Distributed sensor selection for field estimation. In *Proc. of the 42th International Conference on Acoustics, Speech, and Signal Processing (ICASSP 2017)*, New Orleans, USA, Mar. 2017.
- [14] S.P. Chepuri and G. Leus. Subsampling for graph signal detection. In *Proc. of the Asilomar Conference on Signals, systems, and Computers (Asilomar 2016)*, Pacific Grove (California), USA, Nov. 2016.
- [15] S.P. Chepuri and G. Leus. Subsampling for graph power spectrum estimation. In *Proc. of the Ninth IEEE Sensor Array and Multichannel Signal Processing Workshop (SAM 2016)*, Rio de Janeiro, Brazil, Jul. 2016.
- [16] A. Pizzo, S.P. Chepuri, and G. Leus. Towards multi-rigid body localization. In *Proc. of the International Conference on Acoustics, Speech, and Signal Processing (ICASSP 2016)*, Shanghai, Italy, Mar. 2016.
- [17] G. Leus, S.P. Chepuri, and G. Kail. Sparse sensing for statistical inference: model-driven and data-driven paradigms. In *Proc. of Information Theory and Applications Workshop (ITA 2016)*, San Diego, California, USA, Feb. 2016.
- [18] S. Rao, S.P. Chepuri, and G. Leus. Greedy sensor selection for non-linear models. In *Proc. to the IEEE Workshop on Comp. Adv. in Multi-Sensor Adaptive Proc. (CAMSAP 2015)*, Cancun, Mexico, Dec. 2015.
- [19] S. Rao, S.P. Chepuri, and G. Leus. DOA estimation using sparse vector sensor arrays. In *Proc. to the IEEE Workshop on Comp. Adv. in Multi-Sensor Adaptive Proc. (CAMSAP 2015)*, Cancun, Mexico, Dec. 2015.
- [20] S.P. Chepuri and G. Leus. Sparse sensing for estimation with correlated observations. In *Proc. of the Asilomar Conference on Signals, systems, and Computers (Asilomar 2015)*, Pacific Grove (California), USA, Nov. 2015.
- [21] S.P. Chepuri, Y. Zhang, G. Leus, and G.B. Giannakis. Big data sketching with model mismatch. In *Proc. of the Asilomar Conference on Signals, systems, and Computers (Asilomar 2015)*, Pacific Grove (California), USA, Nov. 2015.
- [22] G. Kail, S.P. Chepuri, and G. Leus. Robust censoring for linear inverse problems, stockholm, sweden, jun. 2015. In *In Proc. of IEEE 16th International Workshop on Signal Processing Advances in Wireless Communications (SPAWC 2015)*, Stockholm, Sweden, June 2015.

- [23] S.P. Chepuri and G. Leus. Sparse sensing for distributed gaussian detection. In *In Proc. of the International Conference on Acoustics, Speech, and Signal Processing (ICASSP 2015)*, **(Best student paper award)**, Brisbane, Australia, Apr. 2015.
- [24] S.P. Chepuri and G. Leus. Compression schemes for time-varying sparse signals. In *Proc. of the Asilomar Conference on Signals, systems, and Computers (Asilomar 2014)*, Pacific Grove (California), USA, Nov. 2014.
- [25] S.P. Chepuri and G. Leus. Sensor selection for estimation, filtering, and detection. In *Proc. Int. Conf. on Signal Processing and Communications (SPCOM 2014)*, Bangalore, India, July 2014.
- [26] Keke Hu, S.P. Chepuri, and G. Leus. Near-field source localization using sparse recovery techniques. In *Proc. Int. Conf. on Signal Processing and Communications (SPCOM 2014)*, Bangalore, India, July 2014.
- [27] S.P. Chepuri and G. Leus. Sparsity-promoting adaptive sensor selection for non-linear filtering. In *Proc. Int. Conf. Acoustics, Speech, Signal Proc. (ICASSP 2014)*, Florence, Italy, May 2014.
- [28] S. Khademi, S.P. Chepuri, Z. Irahhtauten, G.J.M. Janssen, and A.J. van der Veen. Channel characterization for wideband 60 ghz wireless link within a metal enclosure. In *Proc. IEEE European Conf. on Antennas and Propagation (EuCAP)*, The Hague, Netherlands, Apr. 2014.
- [29] Keke Hu, S.P. Chepuri, and G. Leus. Near-field source localization: Sparse recovery techniques and grid matching. In *Sensor Array and Multichannel Signal Processing Workshop (SAM)*, pages 369–372, A Coruna, Spain, June 2014.
- [30] S.P. Chepuri, G. Leus, and A.J. van der Veen. Position and orientation estimation of a rigid body: rigid body localization. In *Proc. Int. Conf. Acoustics, Speech, Signal Proc. (ICASSP 2013)*, Vancouver, Canada, May 2013.
- [31] S. Khademi, S.P. Chepuri, G. Leus, and A.J. van der Veen. Zero-forcing pre-equalization with transmit antenna selection in MIMO systems. In *Proc. Int. Conf. Acoustics, Speech, Signal Proc. (ICASSP 2013)*, Vancouver, Canada, May 2013.
- [32] S.P. Chepuri, G. Leus, and A.-J. van der Veen. Sparsity-exploiting anchor placement for localization in sensor networks. In *Proc. 21st European Signal Processing Conference (EUSIPCO)*, Marrakech, Marokko, Sept. 2013.
- [33] S.P. Chepuri, A. Simonetto, G. Leus, and A.-J. van der Veen. Tracking position and orientation of a mobile rigid body. In *Proc. 5th IEEE International Workshop on Computational Advances in Multi-Sensor Adaptive Processing (CAMSAP 2013)*, St. Maarten, French Antilles, Dec. 2013.
- [34] V. Roy, S.P. Chepuri, and G. Leus. Sparsity-enforcing sensor selection for DOA estimation. In *Proc. 5th IEEE International Workshop on Computational Advances in Multi-Sensor Adaptive Processing (CAMSAP 2013)*, St. Maarten, French Antilles, Dec. 2013. IEEE.
- [35] S.P. Chepuri, G. Leus, and R. de Francisco. Multiple hypothesis testing for compressive wideband sensing. In *Proc. IEEE Workshop on Signal Processing Advances in Wireless Communications (SPAWC 2012)*, Cesme, Turkey, June 2012.
- [36] S.P. Chepuri, R. de Francisco, and G. Leus. Low-power architecture for wideband spectrum sensing. In *Proc. of 3rd International Workshop on Cognitive Information Processing (CIP 2012)*, Baiona, Spain, May 2012.
- [37] S.P. Chepuri, G. Leus, and A.J. van der Veen. Joint localization and clock synchronization for wireless sensor networks. In *46th Asilomar Conference on Signals, Systems and Computers*, Pacific Grove (California), USA, Nov. 2012.

- [38] S.P. Chepuri, R. de Francisco, and G. Leus. Performance evaluation of an iee 802.15.4 cognitive radio link in the 2360-2400 mhz band. In *Proc. IEEE Wireless Communications and Networking Conference (WCNC)*, Cancun, Mexico, March 2011.
- [39] S. Maleki, S.P. Chepuri, and G. Leus. Optimal hard fusion strategies for cognitive radio networks. In *Proc. IEEE Wireless Communications and Networking Conference (WCNC)*, Cancun, Mexico, March 2011.
- [40] S. Maleki, S.P. Chepuri, and G. Leus. Energy and throughput efficient strategies for cooperative spectrum sensing in cognitive radios. In *2011 IEEE 12th Int. Workshop on Signal Proc. Advances in Wireless Comm. (SPAWC)*, San Francisco (California), USA, June 2011.