Rodrigo A. Lobos

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RESEARCH EXPERIENCE

University of Michigan, Ann Arbor, MI — January 2023 - Present
Research Fellow
- Supervisors: Jeffrey Fessler, Ph.D., Douglas Noll, Ph.D.

University of Southern California (USC), Los Angeles, CA — August 2015 - December 2022
Research Assistant
- Supervisor: Justin Haldar, Ph.D.

EDUCATION

University of Southern California (USC), Los Angeles, CA — December 2022
Ph.D., Electrical Engineering
- Dissertation: *New theory and methods for accelerated MRI reconstruction*
- Advisor: Professor Justin P. Haldar

University of Southern California (USC), Los Angeles, CA — December 2020
M.A., Applied Mathematics
Thesis: *Autoregression and structured low-rank modeling of sinograms*

Universidad de Chile, Santiago, Chile — August 2015
M.Sc., Electrical Engineering
- Thesis: *Application of signal processing tools in natural rock textures characterization and astrometry*

Universidad de Chile, Santiago, Chile — November 2012
B.Sc., Electrical Engineering

RESEARCH INTERESTS

Computational imaging; Inverse problems; Machine learning; Statistical signal and image processing; MRI reconstruction; Tomographic reconstruction; Biomedical imaging

CONFERENCE PAPER AWARDS

Best Paper Award Finalist — 2020
IEEE International Symposium on Biomedical Imaging (ISBI)
11 papers were selected out of 747 submissions

Summa Cum Laude Abstract Award (top 3%) — 2017
International Society for Magnetic Resonance in Medicine
Featured with a Power Pitch presentation (hand-selected as one of the 220 most interesting abstracts out of 6,780 submissions to the conference)

AWARDS AND FELLOWSHIPS

Selected as an ISMRM Junior Fellow — 2025
During postdoc at University of Michigan

Selected as a Ming Hsieh Institute Ph.D. Scholar 2021
University of Southern California

Best Teaching Assistant Recognition Award 2021
University of Southern California

Best Master's Thesis in Electrical Engineering 2015
Universidad de Chile

Outstanding Graduate Student Award 2015
Award given by The School of Engineers of Chile.
Best graduated student in Electrical Engineering at Universidad de Chile in 2015

Master's Degree Fellowship 2013
Given by CONICYT-Chile (National Commission for Scientific and Technological Research)

JOURNAL PUBLICATIONS

[J15] **R. A. Lobos**, X. Wang, R. T. L. Fung, Y. He, D. Frey, D. Gupta, Z. Liu, J. A. Fessler, D. C. Noll. "Spatiotemporal Maps for Dynamic MRI Reconstruction.", *IEEE Transactions on Computational Imaging*, (in press).

[J14] **R. A. Lobos**, J. Salazar Cavazos, R. R. Nadakuditi, J. A. Fessler. "Smooth optimization using global and local low-rank regularizers.", *SIAM Journal on Imaging Sciences*, (in press).

[J13] **R. A. Lobos**, C.-C. Chan, J. P. Haldar. "New Theory and Faster Computations for Subspace-Based Sensitivity Map Estimation in Multichannel MRI.", *IEEE Transactions on Medical Imaging*, 43:286-296, 2024.

[J12] D. Kim, J. Coll-Font, **R. A. Lobos**, D. Stab, J. Pang, A. Foster, T. Garrett, X. Bi, P. Speier, J. P. Haldar, C. Nguyen. "Single breath-hold CINE imaging with combined Simultaneous Multi-Slice (SMS) and Region-Optimized Virtual (ROVir) coils. ", *Magnetic Resonance in Medicine*, 90:222-230, 2023.

[J11] G. Ramos-Llorden, **R. A. Lobos**, T. H. Kim, Q. Tian, T. Witzel, H.-H. Lee, A. Scholz, B. Keil, A. Yendiki, B. Bilgic, J. P. Haldar, S. Y. Huang. "High-fidelity, high-spatial-resolution diffusion MRI of the ex vivo whole human brain at ultra-high gradient strength with structured low-rank EPI ghost correction. ", *NMR in Biomedicine*, 36:e4831, 2023.

[J10] **R. A. Lobos**, J. P. Haldar. "On the Shape of Convolution Kernels in MRI Reconstruction: Rectangles versus Ellipsoids.", *Magnetic Resonance in Medicine*, vol. 87, no.6: pp. 2989-2996, 2022.

[J9] **R. A. Lobos**, M. U. Ghani, W. C. Karl, R. M. Leahy, J. P. Haldar. "Autoregression and Structured Low-Rank Modeling of Sinogram Neighborhoods.", *IEEE Transactions on Computational Imaging*, vol. 7, no. 6: pp. 1044-1054, September, 2021

[J8] **R. A. Lobos**, W. S. Hoge, A. Javed, C. Liao, K. Setsompop, K. S. Nayak, J. P. Haldar. "Robust Autocalibrated Structured Low-Rank EPI Ghost Correction.", *Magnetic Resonance in Medicine*, vol. 85, no.6: pp. 3404-3419, June, 2021.

[J7] Gonzalo Díaz, Julián M. Ortiz, Jorge F. Silva, **Rodrigo A. Lobos** and Alvaro Egaña. "Variogram-Based Descriptors for Comparison and Classification of Rock Texture Images", *Mathematical Geoscience*, vol. 52, no. 4: pp. 451-476, May, 2020.

[J6] Sebastián Espinosa, Jorge F. Silva, Rene A. Mendez, **Rodrigo Lobos** and Marcos E. Orchard. "Optimality of the maximum likelihood estimator in astrometry", *Astronomy & Astrophysics*, vol. 616, August, 2018.

[J5] **R. A. Lobos**, T. H. Kim, W. S. Hoge, J. P. Haldar. " Navigator-free EPI Ghost Correction with Structured Low-Rank Matrix Models: New Theory and Methods.", *IEEE Transactions on Medical Imaging*, vol. 37, no. 11: pp. 2390-2402 , Nov. 2018.

[J4] **Rodrigo A. Lobos**, Jorge F. Silva, Julián M. Ortiz, Gonzalo Díaz and Alvaro Egañ., "Analysis and Classification of Natural Rock Textures based on New Transform-based Features", *Mathematical Geoscience*, vol. 48, no. 7: pp. 835-870, October, 2016.

[J3] **Rodrigo A. Lobos**, Jorge F. Silva, Rene A. Mendez and Marcos E. Orchard. "Performance analysis of the Least-Squares estimator in astrometry", *Publications of the Astronomical Society of the Pacific* (PASP), vol. 127: pp. 580-594, November, 2015.

[J2] Rene Mendez, Jorge F. Silva, Rodrigo Orostica, and **Rodrigo Lobos**. "Analysis of the Cramér-Rao lower-bound in the joint estimation of astrometry and photometry", *Publications of the Astronomical Society of the Pacific* (PASP), vol. 126, August, 2014.

[J1] Rene Mendez, Jorge F. Silva and **Rodrigo Lobos**, "Analysis and interpretation of the Cramér-Rao lower-bound in astrometry: One dimensional case", *Publications of the Astronomical Society of the Pacific* (PASP), vol. 125: pp. 580-594, May, 2013.

CONFERENCE PROCEEDINGS AND ABSTRACTS

[C12] **R. A. Lobos**, X. Wang, Z. Liu, J. A. Fessler, D. C. Noll. "Spatiotemporal maps for dynamic MRI reconstruction: a proof-of-principle demonstration on single-coil animal gastrointestinal data.", *International Society for Magnetic Resonance in Medicine Annual Meeting*, 2025. (Abstract).

- **Recipient of a Magna Cum Laude ISMRM Merit Award.**

[C11] R. T. L. Fung, **R. A. Lobos**, J. A. Fessler, D. C. Noll, JF. Nielsen. "Sub 2 mm resolution fMRI at 3T using randomly undersampled 3D-EPI with locally low-rank + temporally sparse reconstruction.", *International Society for Magnetic Resonance in Medicine Annual Meeting*, 2025. (Abstract).

[C10] **R. A. Lobos**, C.-C. Chan, J. P. Haldar. "New Theory and Faster Computations for Subspace-Based Sensitivity Map Estimation. ", *International Society for Magnetic Resonance in Medicine Annual Meeting*, 2023. (Abstract).

[C9] G. Ramos-Llorden, **R. A. Lobos,** T. H. Kim, Q. Tian, S. Tounetki, T. Witzel, B. Keil, A. Yendiki, B. Bilgic, J. P. Haldar, S. Huang. "Improved multi-shot EPI ghost correction for high gradient strength diffusion MRI using structured low-rank modeling k-space reconstruction", *International Society for Magnetic Resonance in Medicine Annual Meeting*, 2021. (Abstract)

[C8] D. Kim, **R. A. Lobos**, J. Coll-Font, M. van den Boomen, J. Conklin, J. Pang, D. Staeb, P. Speier, X. Bi, B. Ghoshhajra, J. P. Haldar, C. T. Nguyen. "Feasibility of single breath-hold CINE with combined Simultaneous Multi-Slice (SMS) and Region-Optimized Virtual (ROVir) coils.", *International Society for Magnetic Resonance in Medicine Annual Meeting*, 2021. (Abstract)

- **Recipient of a Magna Cum Laude ISMRM Merit Award.**

[C7] **R. A. Lobos,** T. H. Kim, K. Setsompop, J. P. Haldar. "Advanced New Linear Predictive Reconstruction Methods for Simultaneous Multislice Imaging.", *International Society for Magnetic Resonance in Medicine Annual Meeting*, Sydney, 2020. (Abstract)

[C6] **R. A. Lobos**, R. M. Leahy, J. P. Haldar. "Autoregression and Structured Low-Rank Modeling of Sinograms.", *IEEE International Symposium on Biomedical Imaging*, Iowa City, 2020.

- **Best Paper Award Finalist (One of the best 11 papers out of 747 submissions).**

[C5] **R. A. Lobos**, R. M. Leahy, J. P. Haldar. "Low-Rank Modeling of Local Sinogram Neighborhoods with Tomographic Applications.", *Asilomar Conference on Signals, Systems, and Computers*, Pacific Grove, 2019.

[C4] **R. A. Lobos**, J. P. Haldar. "Improving the Performance of Accelerated Image Reconstruction in K-Space: The Importance of Kernel Shape.", *International Society for Magnetic Resonance in Medicine Annual Meeting*, Montréal, 2019. (Abstract)

[C3] **R. A. Lobos**, A. Javed, K. S. Nayak, W. S. Hoge, J. P. Haldar. " Robust Autocalibrated LORAKS for Improved EPI Ghost Correction with Structured Low-Rank Matrix Models.", *International Society for Magnetic Resonance in Medicine Annual Meeting*, Paris, 2018, p. 3533. (Abstract)

[C2] **R. A. Lobos**, A. Javed, K. S. Nayak, W. S. Hoge, J. P. Haldar. "Robust Autocalibrated LORAKS for EPI Ghost Correction.", *IEEE International Symposium on Biomedical Imaging*, Washington, DC, 2018, p. 663-666.

[C1] **R. A. Lobos**, T. H. Kim, W. S. Hoge, J. P. Haldar. " Navigator-free EPI ghost correction using low-rank matrix modeling: Theoretical insights and practical improvements", *International Society for Magnetic Resonance in Medicine Annual Meeting*, Honolulu, 2017, p. 449. (Abstract)

- **Recipient of a Summa Cum Laude ISMRM Merit Award (Featured with a Power Pitch presentation (hand-selected as one of the 220 most interesting abstracts out of 6,780 submissions to the conference).**

INVITED TALKS

[IT3] **Accelerated MRI Reconstruction Using LORAKS: Leveraging k-space Linear Predictability and Structured Low-rank Modeling to Predict Missing Samples**

- ISMRM Workshop on MRI Acquisition & Reconstruction, Virtual Event, September, 2021

[IT2] **Low-Rank Modeling of Local Sinogram Neighborhoods with Tomographic Applications**

- Asilomar Conference on Signals, Systems, and Computers, Pacific Grove, CA, , November, 2019

[IT1] **Achievability of the Cramér-Rao Lower Bound in Astrometry**

- Dynamical Astronomy in Latin-America (ADELA), Santiago, Chile, September, 2014

TALKS

[T2] **Autoregression and Structured Low-rank Modeling of Sinograms**

- IEEE ISBI, Iowa City, IA, April, 2020

[T1] **Robust Autocalibrated LORAKS for EPI Ghost Correction**

- IEEE ISBI, Washington, D.C., April, 2018

TEACHING EXPERIENCE

University of Michigan, Ann Arbor, MI

Lecturer

- ECE551: Matrix Methods for Signal Processing, Data Analysis and Machine Learning — Fall 2024

University of Southern California, Los Angeles, CA

Teaching Assistant

- EE141: Applied Linear Algebra for Engineering — Fall 2022
  - Instructor of weekly discussion sessions
  - Holding office hours
- EE588: Optimization for the Information and Data Sciences — Fall 2021
  - Instructor of weekly discussion sessions
  - Preparation of homework solutions
  - Holding office hours
- EE503: Probability for Electrical and Computer Engineers — Spring 2021
  - Instructor of weekly discussion sessions
  - Preparation of homework solutions
  - Holding office hours
- EE141: Applied Linear Algebra for Engineering — Fall 2020
  - Instructor of weekly discussion sessions
  - Holding office hours
- EE483: Introduction to Digital Signal Processing — Spring 2020

- Instructor of weekly discussion sessions
- Holding office hours

- EE483: Introduction to Digital Signal Processing — Fall 2019
  - Preparation of homework solutions
  - Holding office hours

Universidad de Chile, Santiago, Chile

Teaching Assistant

- EL7024: Information Theory — Spring 2014
  - Guiding term projects, grading assignments, and holding office hours
- EL3005: Signals and Systems I — Fall 2013
  - Guiding term projects, grading assignments, and holding office hours
- EL4003: Signals and Systems II (Estimation and Detection Theory) — Spring 2013
  - Guiding term projects, grading assignments, and holding office hours

PROFESSIONAL SERVICES

Reviewer

Journals

- IEEE Transactions on Medical Imaging
- IEEE Transactions on Computational Imaging
- IEEE Reviews in Biomedical Engineering
- Magnetic Resonance in Medicine
- SIAM Journal on Imaging Sciences

Conferences

- IEEE International Symposium on Biomedical Imaging (ISBI)
- International Society for Magnetic Resonance in Medicine (ISMRM)

MEMBERSHIPS

- ISMRM trainee member
- IEEE member
- IEEE Signal Processing Society member

SPECIALIZATIONS

- Coursera Deep Learning Specialization — Spring 2021