Héctor Andrade Loarca

Curriculum Vitae

General Information

Birth Date	March 9th, 1991
Birth Place	Querétaro, Querétaro, Mexico
Residence	Berlin/Munich, Germany
Nationality	Mexican
Personal site	`http://hectorandrade.tk`
Github	@arsenal9971

Education

2017-2020 **PhD in Mathematics**, *Technische Universität Berlin (TUB)*, Berlin, Germany, Thesis: "Applied Microlocal Analysis for Deep Neural Networks in Inverse Problems". Supervised by Professor Gitta Kutyniok

2015-2017 **MSc in Mathematics**, *Technische Universität Berlin (TUB)*, Berlin, Germany, *GPA 1.2/1.0*.
Thesis: "Fast Sparse Light Field Reconstruction with Shearlet-Based Inpainting", Supervised by Professor Gitta Kutyniok

2013-2014 **BSc in Mathematics**, *National Autonomous University of Mexico (UNAM)*, Mexico City, Mexico, *GPA 9.93/10* .
Thesis:"Acoustic Metafluid: Periodic Homogenization by two scale convergence", Degree with honours, Supervised by Professor Antonio Capella

2009-2013 **BSc in Physics**, *National Autonomous University of Mexico (UNAM)*, Mexico City, Mexico, *GPA 9.80/10* .

Professional Experience

October 2020-present Postdoctoral Research Assistant (Deep Learning for 3D Shape Reconstruction, SFB Transregio 109 Project C09, Prof. Gitta Kutyniok (LMU) and Prof. Daniel Cremers(TUM)), LMU Munich, Munich, Germany

October 2020-present Student Assistant, LMU Munich, Munich, Germany

March 2019-present Software and algorithm developement consultant for biomedical imaging (remote), AngioWave Imaging (AWI), Boston, Massachussets

October 2017-Septembre 2020 Research Assistant (Stipendiat), Technische Universität Berlin, Berlin, Germany

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February 2015-February 2016	Data Scientist, OPI Analytics (`https://opianalytics.com/`), Mexico City, Mexico
January 2014-August 2015	Research Assistant in Institute of Mathematics, UNAM (with Professor Antonio Capella Kort): Numerical simulation of effective properties in physical materials with microstructure, Mexico City, Mexico
January-June 2015	Teaching Assistant of Computational Methods for Statistical Physics (with Professor David P. Sanders), School of Science, UNAM, Mexico City, Mexico
June-Decemeber 2014	Teaching Assistant of Electromagnetism I (with Professor Mirna Villavicencio Torres), School of Science, UNAM, Mexico City, Mexico
February-June 2014	Teaching Assistant of Electromagnetism I (with Professor Mirna Villavicencio Torres), School of Science, UNAM, Mexico City, Mexico
February-June 2014	Teaching Assistant of Ordinary Differential Equations (with Professor Maria del Carmen Jorge y Jorge), School of Science, UNAM, Mexico City, Mexico
August-December 2013	Teaching Assistant of Classical Mechanics (with Professors David Phillip Sanders and Pablo Barberis Blostein), School of Science, UNAM, Mexico City, Mexico
Summer 2007,2008	Work at CFATA-UNAM (Center of Applied Physics and Advanced Technology) in Shock Wave Lab with Phd Achim Max Loske Mehling (development of electronic circuits to implementations in Shock Wave Machines), Querétaro, Mexico

List of Publications

- H. Andrade-Loarca, G. Kutyniok, *"tfShearlab: The TensorFlow Digital Shearlet Transform for Deep Learning "*, preprint arXiv:2006.04591, 2020
- H. Andrade-Loarca, G. Kutyniok, O. Öktem, *"Shearlets as Feature Extractor for Semantic Edge Detection: The Model-Based and Data-Driven Realm"*, preprint arXiv:1911.12159, 2019
- H. Andrade-Loarca, A. Hashemi, S. Haufe, K.-R. Müller, G. Kutyniok, *"Deep Brain Source Imaging: A LSTM-inspired Approach for EEG Source Localization based on Sparse Bayesian Learning"*, accepted in Signal Processing with Adaptive Sparse Structured Representations (SPARS) Workshop, 2019
- H. Andrade-Loarca, G. Kutyniok, O. Öktem, P. Petersen, *"Extraction of digital wavefront sets using applied harmonic analysis and deep neural networks"*, SIAM J. Imaging Sciences, Vol. 12, No. 4, pp. 1936-1966, 2019
- H. Andrade-Loarca, *"Fast Sparse Light Field Reconstruction with Shearlet-Based Inpainting"*, Master Thesis, supervised by Prof. Gitta Kutyniok, Technische Universität Berlin, 2017
- H. Andrade-Loarca, *"Acoustic Metafluid: Periodic Homogenization by two scale convergence"*, Bachelor Thesis, supervised by Prof. Antonio Capella Kort, UNAM, 2015

Invited Talks

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January 2020	AFG Oberseminar, TU Berlin, Berlin, Germany; with talk "Task-Adapted Reconstruction in Computed Tomography: Microlocal Analysis meets Deep Learning"
May 2019	AFG Oberseminar, TU Berlin, Berlin, Germany; with talk "Insights on learning hard inverse problems"
February 2019	AFG Oberseminar, TU Berlin, Berlin, Germany; with talk "Extraction of digital wavefront sets using applied harmonic analysis and deep neural networks"
August 2018	JuliaCon, International Julia Conference Invited Speaker, UCL, London, UK; with talk "LightFields.jl: Fast 3D image reconstruction for VR applications"
July 2018	PyData Berlin, International Python Conference Invited Speaker, Charite, Berlin, Germany; with talk "LightFields.jl: Fast 3D image reconstruction for VR applications"
August 2018	AFG Oberseminar, TU Berlin, Berlin, Germany; with talk "Learned Tomographic Reconstruction and Wavefront Set"
June-July 2017	PyData Berlin, International Python Conference Invited Speaker, HTW Berlin, Berlin, Germany; with talk "Shearlab.jl: Fast Multidimensional Signal Processing"
June 2017	JuliaCon, International Julia Conference Invited Speaker, UC Berkeley, California, USA; with talk "Shearlab.jl: Fast Multidimensional Signal Processing"

Scientific Talks and Workshops

July 2020	SIAM Conference on Imaging Science, Toronto, Ontario, Canada; with talk "Task-Adapted Reconstruction in Computed Tomography: Microlocal Analysis meets Deep Learning", virtual talk due to covid-19
May 2020	SIAM Conference on Mathematics of Data Science, Cincinnati, Ohio, USA; with talk "Shearlets as Feature Extractor for Semantic Edge Detetion", virtual talk due to covid-19
May 2019	Digital Future Conference, Berlin, Germany: Attending as Young Digital Changer
February 2019	GAMM Annual Meeting, TU Wien, Vienna, Austria; with talk "Extraction of wavefront sets by deep convolutional neural networks and shearlets"
January 2019	Deep Learning and Inverse Problems Workshop, KTH, Stockholm, Sweden; with talk "Learned Primal Dual Reconstruction in Shearlet Domain and Wavefront set recovery"
June 2018	SIAM Conference on Imaging Science, Bologna University, Bologna, Italy; with talk "Solving Inverse Problems in Imaging with Shearlab.jl"
May 2018	Digital Future Science Match, Berlin, Germany: Attending as Young Digital Changer
July-August 2016	BMS Summer School: Mathematical and Numerical Methods in Image Processing, TU Berlin, Berlin, Germany
July 2016	7th European Congress of Mathematics, TU Berlin, Berlin, Germany
December 2015	2nd International Matheon Conference on Compressed Sensing and its Applications, TU Berlin, Berlin, Germany
September 2015	Shape-Up conference, TU Berlin, Berlin, Germany

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August-September 2014 BMS Summer School: Applied Analysis for Materials, Berlin Mathematical School, Technische Universität Berlin, Berlin, Germany

July 2014 First Intensive Program in high performance scientific computing, Geophysics Institute, UNAM, Mexico City, Mexico

July 2013 Third Summer School in Mathematics, CINMA, Querétaro, Mexico

July 2012 Second Summer School in Mathematics, CINMA, Querétaro, Mexico

July 2011 First Summer School in Mathematics, CINMA, Querétaro, Mexico

July 2011 Summer School in Mathematics, IMATE, UNAM, Cuernacava, Morelos, Mexico

Academic Activities

February 2018 6th BMS Student Conference, ZIB, Berlin, Germany; part of organization committee

December 2017 2nd BMS Career Talk, Urania, Berlin, Germany; part of organization committee

December 2017 3rd International MATHEON Conference on Compressed Sensing and its Applications, TU Berlin, Berlin, Germany; part of organization committee

December 2017 CoSIP Intense Course on Deep Learning, TU Berlin, Berlin, Germany; part of organization committee

Extracurricular Activities

December 2016-December 2017 BMS Student Representative

November 2007 National Physics Olympiad, Tuxtla Gutíerrez, Chiapas, Mexico

October 2007 National Logic Olympiad, Morelia, Michoacan, Mexico

November 2006 National Mathematical Olympiad, Zacatecas, Zacatecas, Mexico

Awards and Scholarships

2019 Young Digital Changers Scholarship, Digital Future Science Match, Berlin, Germany

2018 Diversity Scholarship in JuliaCon 2018, International Julia Conference, UCL, London, UK

2018 Young Digital Changers Scholarship, Digital Future Science Match, Berlin, Germany

2017-2020 Berlin Mathematical School Phase II Scholarship, Berlin, Germany

2017 Diversity Scholarship in JuliaCon 2017, International Julia Conference, UC Berkeley, California, USA

2015-2017 Complementary Scholarship for Outstanding Mexican Graduate Students given by the Mexican Secretary of Education

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2015-2017	Berlin Mathematical School Phase I Scholarship, Berlin, Germany
2014	Candidate to "Gabino Barreda" medal for best class student of Mathematics by UNAM
2014	Candidate to "Gabino Barreda" medal for best class student of Physics by UNAM.

Academic Memberships

- Berlin Mathematical School (BMS).
- Berlin Mathematical Research Center (MATH+).
- Activity Group for Mathematics of Data Science (MATH+MoDS).
- Julia Users Group Berlin.

Languages

Spanish	Mother tongue	
English	Fluent	*C1*
German	Fluent	*C1*
Japanese	Basic	*A1*

Computer Skills

Python, Julia, PostgreSQL, R	High Level
TensorFlow, PyTorch	High Level
Fortran 90, C/C++, OpenGL, CUDA	High Level
Wolfram Mathematica	Medium Level
Hadoop, Spark	Medium Level
OpenMPI, OpenCL	Medium Level
JavaScript, HTML5, CSS	Low Level

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