

# AJINKYA A. KADU

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*Curriculum Vitae*

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CONTACT INFORMATION      Ph.D. Student      +31-684-544-914  
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Utrecht University      <https://ajinkyakadu125.github.io>

EDUCATION      **Mathematical Institute, Utrecht University**, The Netherlands  
Ph.D. Candidate, Numerical Analysis and Scientific Computing      **2015 - present**

- Dissertation Topic: Discrete Seismic Tomography
- Advisors: Dr. Tristan van Leeuwen, Prof. Wim Mulder, Prof. Joost Batenburg
- Interests: Seismic Imaging, Computerized Tomography, Numerical Optimization, Level-Set Method, Total-variation, Convex Analysis, Signal Processing

**Indian Institute of Technology Bombay**, Mumbai, India  
Bachelor and Master of Technology, Department of Aerospace Engineering      **2010 - 2015**

- Advisors: Prof. N. Hemachandra, Prof. R. P. Shimpi
- GPA: 8.7/10 (*Specialization*: Operations Research)

WORK EXPERIENCE      *Research Intern, University of British Columbia*, Vancouver, Canada      Jan - Apr, **2016**

- Mentors: Prof. Felix Herrmann, Prof. Eldad Haber
- Worked on development of framework for large-scale inverse problems in geophysics.

*Data Science Intern, Rediff.com Pvt. Ltd.*, Mumbai, India      May - July, **2014**

- Mentor: A. S. Shaja
- Worked on the development of data product 'Stock Portfolio Match' based on Shiny & R.

*Industry Intern, Honeywell Technology Solutions*, Bangalore, India      May - July, **2013**

- Mentors: Kartavya Mohan Gupta, Hanumantha Rao Desu
- Worked on integration bench for General Aviation(GA) to recreate flight test scenarios.

## Research:

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SELECTED PUBLICATIONS

- **Salt reconstruction in full-waveform inversion with a parametric level-set method.**  
Ajinkya Kadu, Tristan van Leeuwen, Wim Mulder,  
*IEEE Transactions on Computational Imaging*, 2017. (arXiv: 1610.00251)
- **A parametric level-set method for partially discrete tomography.**  
Ajinkya Kadu, Tristan van Leeuwen, Joost Batenburg,  
*International Conference on Discrete Geometry and Computer Imagery*, 2017.(arXiv: 1704.00568)
- **A parametric level-set approach for seismic full-waveform inversion.**  
Ajinkya Kadu, Tristan van Leeuwen, Wim Mulder,  
*SEG Annual Meeting Expanded Abstracts 2016*

NEWS ARTICLES

- Geometric Imaging for Subsurface Salt Bodies.  
Tristan van Leeuwen, Ajinkya Kadu, Wim Mulder, *ERCIM News 2017*.
- An Introduction to Seismic Imaging and Current Challenges.  
Ajinkya Kadu, Wim Mulder, (to appear in) *SIAM Online News 2018*.

RESEARCH  
EXPERIENCE

**Distributed seismic Full-Waveform Inversion**

Guide(s): Dr. Rajiv Kumar, Prof. Felix Herrmann

2016-17

The full-waveform inversion is hampered by various issues, including large network waiting time in distributed environment and requirement of sophisticated solvers to handle non-smooth regularizers. To circumvent these issues, we proposed a strategy, called ‘*Consensus Optimization*’. This work has been submitted for EAGE conference, 2018.

**Convex formulation for Discrete Tomography**

Guide: Dr. Tristan van Leeuwen

2017

Discrete Tomography is a *NP-hard* problem. We formulated a *dual* of such problem, which is convex in nature and solves the problem in *polynomial* time. The work is currently in writing process.

**Elephant Herd Optimization - a nature based framework**

Guide: Prof. R. P. Shimpi

2014-15

Devised first of a kind algorithm for optimization based on *swarm intelligence* and long-range *communication* of elephants. The method is mainly applicable to solve global optimization problems, fuzzy clustering, training of artificial neural networks.

CONFERENCES

**Key Presentations**

- Society of Exploration Geophysics Annual Meeting, Houston, USA Sep 2017
- Discrete Geometry for Computer Imagery, Vienna, Austria Sep 2017
- Society of Exploration Geophysics Annual Meeting, Dallas, USA Oct 2016
- Computational Sciences for Future Energy Conference, Utrecht, Netherlands Oct 2016

**Invited Talks**

- SIAM Conference on Geosciences, Erlangen, Germany Sep 2017
- Topology Optimization Group Meeting, TU Delft, Netherlands Aug 2017
- SIAM Annual Meeting, Pittsburgh, PA July 2017
- Biweekly Tomomeeting, Computational Imaging Group, Amsterdam Jan 2017
- Mini-Symposium on Seismic Imaging, Delft, Netherlands May 2016
- Seismic Seminar, SLIM Group, Vancouver, Canada Apr 2016

**Academic Experience and Achievements:**

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SCHOLASTIC  
ACHIEVEMENTS

**Travel Awards**

- SIAM Student Chapter Representative at SIAM AN17, Pittsburgh July 2017
- INdAM Mathtech Workshop on Biomedical Imaging, Rome, Italy Feb 2017
- SIGMA Workshop, CIRM Marseille, France Nov 2016
- NWO International Research Travel Grant to visit University of British Columbia Jan 2016

**Student Awards**

- Received Best Poster Award at NWO NDNS+ Workshop at Twente, NL. June 2016
- Awarded Shell-NWO’s CSER Fellowship to pursue graduate studies in Netherlands. 2015-19
- Received Graduate Student Fellowship from Govt. of India for Master degree. 2015
- Secured AIR-771 in IIT-JEE 2010 among 0.47 million students across India. 2010
- Secured High Distinction in Maths Olympiads conducted by Maharashtra state Govt. 2005-08

GRADUATE  
COURSEWORK

- Wavefield Imaging
- Inverse Problems
- Machine Learning
- Convex Optimization
- Randomized Linear Algebra
- Ordinary Differential Equations
- Partial Differential Equations

TECHNICAL SKILLS	<ul style="list-style-type: none"> <li>• <i>Languages</i>: C/C++, Python, HTML, CSS, JavaScript</li> <li>• <i>Packages</i>: MySQL, MATLAB, Mathematica, Julia</li> <li>• <i>Operating System</i>: Mac, GNU/Linux, Windows</li> <li>• <i>Optimization Packages</i>: Gurobi, CVX, OSQP, CPLEX, MOSEK, TOMLAB</li> <li>• <i>Deep Learning Packages</i>: scikit-learn, PyTorch, TensorFlow</li> </ul>
TEACHING EXPERIENCES	<p><b>Teaching Assistant – Utrecht University</b></p> <ul style="list-style-type: none"> <li>• WISB 251: Numerical Analysis <span style="float: right;">Nov 2017 - Present</span></li> <li>• WISB 356: Introduction to Scientific Computing <span style="float: right;">Jan - Apr 2017</span></li> <li>• WISB 251: Numerical Analysis <span style="float: right;">Nov 2016 - Jan 2017</span></li> </ul> <p><b>Teaching Assistant – IIT, Bombay</b></p> <ul style="list-style-type: none"> <li>• AE 151: Introduction to Aerospace Engineering <span style="float: right;">Jan - Apr 2015</span></li> <li>• AE 308: Engineering Design Optimization <span style="float: right;">July - Nov 2014</span></li> </ul>
MEMBERSHIPS	<ul style="list-style-type: none"> <li>• Society for Industrial and Applied Mathematics (SIAM)</li> <li>• Institute of Electrical and Electronics Engineers (IEEE)</li> <li>• Werkgezemschap Scientific Computing (WSC)</li> <li>• Society of Exploration Geophysics (SEG)</li> </ul>

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### Extracurricular Activities:

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SERVICE	<p>Founding Member, <b>SIAM Student Chapter</b>, Utrecht University (2017)</p> <ul style="list-style-type: none"> <li>• Spearheaded the formation of chapter and managing its website and social awareness.</li> <li>• Represented student chapter at SIAM Annual Meeting 2017 at Pittsburgh, PA.</li> </ul> <p>Coordinator, <b>Department Academic Mentorship Program</b>, IIT Bombay (2014-15)</p> <ul style="list-style-type: none"> <li>• Led a team of 19 mentors to provide academic support to 120 students.</li> <li>• Implemented ‘<i>Progress Review System</i>’ to ensure accountability of team &amp; progress of students.</li> </ul>
JOURNALISM	<ul style="list-style-type: none"> <li>• Served as a Chief Editor for <i>Airspace</i> magazine, India’s first annual aviation magazine (2015).</li> <li>• Published articles on <i>Indian Airlines</i> and <i>Healthcare</i> at Rediff Labs; viewership of more than 5K.</li> </ul>
SPORTS	<ul style="list-style-type: none"> <li>• Finished in Top 10 at <i>Thane 10K Marathon</i> among ~ 60,000 contestants (2014).</li> <li>• Part of winning team of <i>Aerospace Cricket Tournament</i> for 3 years consecutively (2011-13), Awarded best bowler and an all-rounder every year.</li> </ul>

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REFERENCES <sup>1</sup>	<ul style="list-style-type: none"> <li>• <b>Tristan van Leeuwen</b>, Assistant Professor (<i>Tenure-track</i>), Mathematical Institute, Utrecht University.</li> <li>• <b>Wim A. Mulder</b>, Professor in Geophysics, Delft University of Technology, Researcher, Shell Global Solutions International B.V.</li> <li>• <b>Joost Batenburg</b>, Group Leader, Computational Imaging, Centrum Wiskunde Informatica(CWI), Professor of Discrete Mathematics &amp; Tomography, Leiden University.</li> </ul>
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<sup>1</sup>available on request