

# Souvik Roy

Assistant Professor,  
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SEIR 219

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## Professional Experience

- **University of Texas at Arlington (UTA)**  
*Assistant Professor*  
Arlington, Texas, USA  
August, 2018 – present
- **Tata Institute of Fundamental Research,  
Centre for Applicable Mathematics (TIFR-CAM)**  
*Visiting fellow*  
Bangalore, India  
March, 2018 – July, 2018
- **University of Würzburg**  
*Postdoctoral fellow*  
Würzburg, Germany  
Sep, 2016 – Sep, 2017
- **International Centre for Theoretical Sciences (ICTS)  
and University of Nice**  
*Joint postdoctoral fellow*  
Bangalore India  
Nice, France  
Jan, 2016 – August, 2016
- **University of Würzburg**  
*Postdoctoral fellow*  
Würzburg, Germany  
July, 2015 – Dec, 2015
- **University of Texas at Arlington**  
*Postdoctoral fellow*  
Texas, USA  
Jan, 2015 – May, 2015
- **University of Würzburg**  
*Deutscher Akademischer Austauschdienst (DAAD) visiting scientist*  
Würzburg, Germany  
Oct 2014 – Dec 2014

## Education

- **Tata Institute of Fundamental Research, CAM**  
*Ph.D. Mathematics*  
Bangalore, India  
2011 – 2015
  - Dissertation title: Reconstruction of a class of fluid flows by variational methods and inversion of integral transforms in tomography.
  - Advisors: A. S. Vasudeva Murthy, Praveen Chandrashekar and Venkateswaran P. Krishnan.
- **Tata Institute of Fundamental Research, CAM**  
*M.Phil. Mathematics*  
Bangalore, India  
2010 – 2011
  - Thesis title: Optical Flows – Determination of 2D velocities of a moving fluid.
  - Advisors: A. S. Vasudeva Murthy and Praveen Chandrashekar.
- **Tata Institute of Fundamental Research, CAM**  
*M.Sc. Mathematics*  
Bangalore, India  
2008 – 2010
  - Graduated with 1<sup>st</sup> rank and a 79.25% score.
- **Ramakrishna Mission Vidyamandira, Belur Math**  
*University of Calcutta*  
*B.Sc. Mathematics*  
West Bengal, India  
2005 – 2008
  - Graduated with 4<sup>th</sup> rank and a 82.5% score.

## Current Research Interests

- Inverse problems and optimal control in medical imaging and health sciences.
- Pharmacokinetic modeling and control for treatment of cancer.
- Computational ordinary and partial differential equations
- Numerical methods for fluid flows.
- Shape optimization.

## Grants

### Awarded

1. **PI (along with Co-PI Zui Pan):**  
*Interdisciplinary Research Program, University of Texas at Arlington,*  
Grant number: 2021-772, Amount: \$20,000.  
Title: “A Data-Driven Computational Pharmacokinetic Framework for EGFR-Targeting Therapy in Esophageal Cancer”. Sep, 2021 – Aug, 2022
2. **Multi-PI (MPI) (along with MPI Suvra Pal and MPI Leili Shahriyari):**  
*National Cancer Institute-National Institutes of Health (NCI-NIH),*  
Grant number: 1R21CA242933-01, Amount: \$386,767 (UTA amount: \$116,160).  
Title: “Data-driven QSP software for personalized colon cancer treatment”. Sep, 2019 – Aug, 2021
3. **PI: H.C. Ørsted COFUND grant (under Marie Skłodowska-Curie Actions grant no. 609405 (FP7) and 713683 (H2020))** for postdoctoral studies at Denmark Technical University, approx. Amount: \$151,210.  
Title: “Optimization methods for hybrid inverse problems”. Oct, 2017 – Sep, 2019  
(S. Roy declined the offer due to accepting the UTA assistant professor position).

### Pending

1. **PI:**  
*National Science Foundation, Division of Mathematical Sciences (NSF-DMS),*  
Amount: \$413,361. Apr, 2022 – Mar, 2027  
Title: “CAREER: Mathematical frameworks for control of stochastic signaling pathway dynamics in cardiovascular diseases”.
2. **Co-PI (PI: Hristo Kojouharov):**  
*National Science Foundation, Division of Mathematical Sciences (NSF-DMS),*  
Amount: \$1,648,265. Sep, 2021 – Aug, 2026  
Title: “RTG: Vertically integrated interdisciplinary training in mathematics for human health”.
3. **Co-PI (along with PI Suvra Pal):**  
*National Science Foundation, Division of Mathematical Sciences (NSF-DMS),*  
Amount: \$291,744. Jun, 2022 – May, 2025  
Title: “Statistical and Computational Aspects of Novel Machine Learning-Based Cure Models in High-Dimensional Setup”.

4. **Multi-PI (MPI) (along with MPI Zui Pan, Co-I Benito Chen, Co-I Hristo Kojouharov, Co-I Suvra Pal and Co-I David Wang):**  
*National Cancer Institute-National Institutes of Health (NCI-NIH),*  
 Amount: \$395,510. Apr, 2022 – Mar, 2024  
 Title: “The development of a data-driven computational pharmacokinetic software for RTK-targeting therapy in esophageal cancer”.
5. **PI (along with Co-PI Hristo Kojouharov, Co-PI Zui Pan and Co-PI Suvra Pal):**  
*National Science Foundation, Division of Mathematical Sciences (NSF-DMS),*  
 Amount: \$354,459. Sep, 2022 – Aug, 2025  
 Title: “A new stochastic mathematical framework to study the dynamics of calcium signaling pathways and associated therapies in esophageal cancer”.

## Awards and Honors

- Selected as a member of the prestigious NASDC course “Utah Advanced Course on Mentoring, Leadership, and Cancer-related Health Disparities”. January 2021
- Selected as a member of the prestigious NCI-NIH Innovation Lab “Advancing Cancer Biology at the Frontiers of Machine Learning and Mechanistic Modeling”. August, 2020
- Certified Leader in Education, NRI Welfare Society of India and Association of Leaders in Education. April, 2019
- University of Texas at Arlington Freshman Leaders on Campus Honored Professor. March, 2019
- SIAM travel award for attending the Gene Golub SIAM Summer School, Austria. Aug, 2014
- Ranked 1<sup>st</sup> in the M.Sc exams at Tata Institute of Fundamental Research, CAM. 2008 – 2010
- Ranked 4<sup>th</sup> in the B.Sc. exams at University of Calcutta. 2005 – 2008
- Ranked 71<sup>st</sup> (out of more than 10000 participants) in the National Science Olympiad, India. 2004

## Fellowships

- Postdoctoral fellowship under Deutsche Forschungsgemeinschaft (DFG) grant at University of Würzburg, Germany. Sep, 2016 – Sep, 2017
- Indo-French Centre for Applied Mathematics (IFCAM) visiting scientist fellowship for postdoctoral studies at University of Nice, France. April, 2016 – June, 2016
- International Centre For Theoretical Sciences postdoctoral fellowship. Jan, 2016 – August, 2016
- Postdoctoral fellowship under the project “Multi-ITN Strike” at University of Würzburg, Germany. July, 2015 – Dec, 2015
- University of Texas at Arlington and AIRBUS fellowship for postdoctoral studies at University of Texas at Arlington Jan, 2015 – May, 2015

- Deutscher Akademischer Austauschdienst (DAAD) visiting scholar fellowship for research visit to University of Würzburg, Germany. Oct, 2014 – Dec, 2014
- Tata Institute of Fundamental Research, CAM doctoral fellowship. 2010 – 2015
- Tata Institute of Fundamental Research, CAM masters fellowship. 2008 – 2010

## Publications, Abstracts and Reports

### Submitted Publications

1. **Souvik Roy**. A new nonlinear sparse optimization framework for superior reconstructions in ultrasound-modulated optical tomography, (*under review*), 2021.
2. Suvra Pal, Zui Pan and **Souvik Roy**. A stochastic framework for parameter estimation and uncertainty quantification in colon cancer-induced angiogenesis, (*under review*), 2021.
3. Madhu Gupta, John M Slezak, Fawaz Alalhareth, **Souvik Roy** and Hristo Kojouharov. Second-order modified nonstandard Runge-Kutta and theta methods for one-dimensional autonomous differential equations, (*under review*), 2020.
4. Fawaz Alalhareth, John M Slezak, Madhu Gupta, **Souvik Roy** and Hristo Kojouharov. Second-order modified positive and elementary stable nonstandard numerical methods for one-dimensional autonomous differential equations, (*under review*), 2020.

### Peer-reviewed Publications

1. Jan Bartsch, Alfio Borzi, Francesco Fanelli and **Souvik Roy**. A numerical investigation of Brockett's ensemble optimal control problems. *Numerische Mathematik (to appear)*, 2021.
2. Yan Chang, **Souvik Roy** and Zui Pan. Store-Operated Calcium Channels as Drug Target in Gastroesophageal Cancers. *Frontiers in Pharmacology*, 2021.
3. **Souvik Roy**, Suvra Pal, Achyuth Manoj, Susanth Kakarla, Juan Villegas and Mesfer Alajmi. A Fokker-Planck framework for parameter estimation and sensitivity analysis in colon cancer. *AIP Conference Proceedings (to appear)*, 2021.
4. Anisa M. H. Chorwadwala and **Souvik Roy**, Placement of an obstacle for optimizing the fundamental eigenvalue of divergence form elliptic operators. *Variational Methods in Mechanics*, P. M. Mariano Editors., series "Advances in Continuum Mechanics", Birkhauser-Springer, Boston, (*in print*), 2021.
5. Rim Gouia-Zarrad, **Souvik Roy** and Sunghwan Moon. Numerical inversion and uniqueness of a spherical Radon transform restricted with a fixed angular span, *Applied Mathematics and Computation*, 408(1):126338, 2021.
6. Madhu Gupta, Rohit Kumar Mishra and **Souvik Roy**. Sparsity-based nonlinear reconstruction of optical parameters in two-photon photoacoustic computed tomography, *Inverse Problems*, 37:044001, 2021.
7. Suvra Pal and **Souvik Roy**. On the estimation of destructive cure rate model: a new study with exponentially weighted Poisson competing risks *Statistica Neerlandica*, 75(3): 324–342, 2021.

8. Madhu Gupta, Rohit Kumar Mishra and **Souvik Roy**. Sparse reconstruction of log-conductivity in current density impedance tomography. *Journal of Mathematical Imaging and Vision*, 62:189-205, 2020.
9. Hristo Kojouharov, **Souvik Roy**, Madhu Gupta, Fawaz Alalhareth and John M Slezak. A second-order nonstandard theta method for autonomous differential equations, *Applied Mathematics Letters*, 112:106775, 2020.
10. Suvra Pal and **Souvik Roy**. A new non-linear conjugate gradient algorithm for destructive cure rate model and a simulation study: illustration with negative binomial competing risks, *Communications in Statistics - Simulation and Computation*, doi: 10.1080/03610918.2020.1819321, 2020.
11. **Souvik Roy**. A sparsity-based Fokker-Planck optimal control framework for modeling traffic flows, *AIP Conference Proceedings*, 2302:110007, 2020.
12. Madhu Gupta, Fawaz Alalhareth, John M Slezak, **Souvik Roy** and Hristo Kojouharov. Second-order nonstandard explicit Euler method, *AIP Conference Proceedings*, 2302:110003, 2020.
13. Anisa M.H. Chorwadwala and **Souvik Roy**. How to place an obstacle having a dihedral symmetry centered at a given point inside a disk so as to optimize the fundamental Dirichlet eigenvalue. *Journal of Optimization Theory and Applications*, 184(1):162-187, 2020.
14. Jan Bartsch, Alfio Borzì, Francesco Fanelli and **Souvik Roy**. A theoretical investigation of Brockett's ensemble optimal control problems. *Calculus of Variation and Partial Differential Equations*, 58:162, 2019.
15. **Souvik Roy**, Mario Annunziato, Alfio Borzì and Christian Klingenberg. A Fokker-Planck approach to control collective motion. *Computational Optimization and Applications*, 69(2):423–459, 2018.
16. Gaik Ambartsoumian, Rim Gouia-Zarrad, Venkateswaran P. Krishnan and **Souvik Roy**. Image reconstruction from radially incomplete spherical Radon data. *European Journal of Applied Mathematics*, 29(3):470–493, 2018.
17. **Souvik Roy** and Alfio Borzì. A new optimisation approach to sparse reconstruction of log-conductivity in acousto-electric tomography. *SIAM Journal of Imaging Sciences*, 11(2):1759–1784, 2018.
18. Bolaji Adesokan, Kim Knudsen, Venkateswaran P. Krishnan and **Souvik Roy**. A fully non-linear optimization approach to acousto-electric tomography. *Inverse Problems*, 34:104004, 2018.
19. **Souvik Roy**, Alfio Borzì and Abderrahmane Habbal. Pedestrian motion constrained by FP-constrained Nash games. *Royal Society Open Science*, 4(9):170648, 2017.
20. Praveen Chandrashekar, **Souvik Roy** and A. S. Vasudeva Murthy. A variational approach to estimate incompressible fluid flows. *Proceedings of Mathematical Sciences, Springer*, 127(1):175–201, 2017.
21. **Souvik Roy** and Alfio Borzì. Numerical investigation of a class of Liouville control problems. *Journal of Scientific Computing*, 73(1):178–202, 2017.
22. Gaik Ambartsoumian and **Souvik Roy**. Numerical inversion of a broken ray transform arising in single scattering optical tomography. *IEEE Transactions on Computational Imaging*, 2(2):166–173, 2016.

23. **Souvik Roy**, Mario Annunziato and Alfio Borzì. A Fokker–Planck feedback control-constrained approach for modelling crowd motion. *Journal of Computational and Theoretical Transport*, 45(6):452–458, 2016.
24. **Souvik Roy**, Venkateswaran P. Krishnan, Praveen Chandrasekhar and A. S. Vasudeva Murthy. An efficient numerical algorithm for Radon transform inversion with applications in ultrasound imaging. *Journal of Mathematical Imaging and Vision, Springer*, 53:78–91, 2015.
25. **Souvik Roy**, Praveen Chandrashekar and A. S. Vasudeva Murthy. A variational approach to optical flow estimation of unsteady incompressible flows. *International Journal of Advances in Engineering Sciences and Applied Mathematics, Springer*, 7(3):149–167, 2015.

### Conference Proceedings (Not Peer-reviewed)

1. Gaik Ambartsoumian, **Souvik Roy**, Gaurav Khatri and Phillipe Zimmern. Automatic segmentation and 3D visualization of pelvic mesh using mathematical modelling and machine learning techniques in MRI, *Neurology and Urodynamics, ICS 49<sup>th</sup> Annual Meeting*, 38:S54-S55, 2019.
2. Gaurav Sharma and **Souvik Roy**. Bubble drag coefficient formulation and stability analysis for multiphase-turbomachinery problems (Shear flow/breakup GE2), *Modeling week and study group meeting on industrial problems*, Supercomputer Education Research Center, Indian Institute of Science, Bangalore, India, 58-73, 2011.
3. Andrew A. Lacey, A. S. Vasudeva Murthy, **Souvik Roy** and Arnab Jyoti Dasgupta. Fish feeding. *Modeling week and study group meeting on industrial problems*, Supercomputer Education Research Center, Indian Institute of Science, Bangalore, India, 32-55, 2011.

### Technical Reports, Book Reviews and Dissertations

1. Carlos Chan, Mahsa Dabagh, Dave Fuller, Sara Gosline and **Souvik Roy**. Personalized prediction of treatment response for peritoneal carcinomatosis via a hybrid mechanistic/AI approach, *Technical Report, Advancing Cancer Biology at the Frontiers of Machine Learning and Mechanistic Modeling*, NCI-NIH Innovation Lab, 2020.
2. **Souvik Roy** Review of Handbook of Numerical Methods for Hyperbolic Problems: Basic and Fundamental Issues (Rémi Abgrall and Chi-Wang Shu), *SIAM Reviews*, 60(3):768-771, 2018.
3. **Souvik Roy**. Reconstruction of a class of fluid flows by variational methods and inversion of integral transforms in tomography. *Doctoral Dissertation*, TIFR-CAM, 2015.
4. **Souvik Roy**. Optical Flows – Determination of 2D velocities of a moving fluid. *M.Phil Dissertation*, TIFR-CAM, 2011.

### Selected List of Invited Presentations

1. **A new nonlinear sparse optimization framework for ultrasound-modulated optical tomography (30 min)**  
*Mini-symposium talk at SIAM Texas-Louisiana Conference* *November, 2021*

2. **A projected non-linear conjugate gradient algorithm for parameter estimation in a cure rate model (30 min)**  
*Mini-symposium talk at International Conference on Advances in Interdisciplinary Statistics and Combinatorics (online)* *October, 2021*
3. **A new nonlinear sparse optimization framework for two-photon photoacoustic computed tomography (30 min)**  
*Mini-symposium talk at SIAM Southeastern Atlantic Section Conference, Auburn University (online)* *September, 2021*
4. **A Nash games framework to control pedestrian behavior (30 min)**  
*Mini-symposium talk at SIAM Conference on Optimization (online)* *July, 2021*
5. **A projected non-linear conjugate gradient algorithm for parameter estimation in a cure rate model (30 min)**  
*Mini-symposium talk at Statistics' 21. Concordia University (online)* *July, 2021*
6. **A Data-driven stochastic framework for treatment assessment in colon cancer (30 min)**  
*Mini-symposium talk at 13<sup>th</sup> conference of the Euro-American consortium AMiTaNS'21 (online)* *June, 2021*
7. **A Fokker-Planck stochastic framework for treatment assessment in colon cancer (60 min)**  
*Department of Mathematics Seminar, Texas A&M Corpus Christi (Online)* *April, 2021*
8. **Parameter estimation and uncertainty quantification in colon cancer-induced angiogenesis using a Fokker-Planck stochastic framework (60 min)**  
*Applied Mathematics Seminar, University of Texas at Arlington (Online)* *April, 2021*
9. **An introduction to linear ordinary differential equations and some numerical methods (60 min)**  
*Mathematics Department Seminar, Mediterranean Institute of Technology (Online)* *February, 2021*
10. **A new nonlinear sparse optimization framework for ultrasound-modulated optical tomography (30 min)**  
*Mini-symposium talk at DMV Annual Meeting (Online)* *September, 2020*
11. **Personalized prediction of treatment response for peritoneal carcinomatosis via a hybrid mechanistic/AI approach (10 min)**  
*Group report presentation at NCI-NIH Innovation Lab (Online)* *August, 2020*
12. **Reconstruction of sparse log-conductivity in current density impedance imaging (15 min).**  
*SIAM conference on imaging sciences (IS20) (Online)* *July, 2020*
13. **A Pontryagin maximum principle based Fokker-Planck approach to control traffic motion. (30 min)**  
*Mini-symposium talk at 12<sup>th</sup> conference of the Euro-American consortium AMiTaNS'20 (online)* *June 2020*
14. **A Fokker-Planck approach to control crowd motion (30 min)**  
*Mini-symposium talk at TX-LA SIAM Section Meeting, Southern Methodist University, USA* *November, 2019*

15. **Developing data-driven models for obtaining personalized cancer treatments (15 min)**  
*National Institutes of Health, Informatics Technology for Cancer Research (NIH ITCR)*  
*Teleconference, USA* *November, 2019*
16. **A Nash games framework to control pedestrian behavior (30 min)**  
*Mini-symposium talk at French-German-Swiss conference on Optimization, Nice, France* *September, 2019*
17. **A new non-linear optimization framework for acousto-electric tomography (30 min)**  
*Mini-symposium talk at the conference Applied Inverse Problems, Grenoble, France* *July, 2019*
18. **A Fokker-Planck approach to control crowd motion (30 min)**  
*Collaborative Conference on Math-Finance and Statistics, Hawaii, USA* *March, 2019*
19. **Controlling pedestrian motion through a Nash games framework (50 min)**  
*Guest Speaker, Mathematical Association of America,*  
*University of Texas at Arlington, USA* *March 2019*
20. **A fully non-linear optimization approach for acousto-electric tomography (50 min)**  
*Computational Science Seminar, University of Texas, Dallas, USA* *February, 2019*
21. **Math: A boon or a curse (50 min)**  
*Guest Speaker at a faculty program for student residents,*  
*University of Texas at Arlington, USA* *November, 2018*
22. **Inverse problems and PDE-constrained optimization (50 min)**  
*SIAM Student Chapter, University of Texas at Arlington, USA* *October, 2018*
23. **Non-linear optimization methods for acousto-electric tomography (45 min)**  
*Departmental Seminar, TIFR-CAM, India* *May, 2018*
24. **An introduction to linear ordinary differential equations and some numerical methods (50 min)**  
*Mathematics Department Seminar, American University of Sharjah, UAE* *April, 2018*
25. **A Fokker-Planck Nash differential game to model crowd motion with avoidance (50 min)** *Mathematics Department Colloquium, American University of Sharjah, UAE* *April, 2018*
26. **A Fokker-Planck Nash differential game to model crowd motion with avoidance (50 min)**  
*Mathematics Department Seminar, Denmark Technical University, Denmark* *August, 2017*
27. **A novel numerical method for a class of Liouville control problems (30 min)**  
*Workshop on Numerical Methods for Optimal Control and Inverse Problems,*  
*Technical University of Munich, Germany* *April, 2017*
28. **Numerical inversion of a broken ray transform arising in single scattering optical tomography (30 min)**  
*Mini-symposium talk at the conference "100 Years of the Radon Transform", The Radon Institute of Computational and Applied Mathematics, Linz, Austria* *March, 2017*
29. **Numerical investigation of a class of Liouville control problems (50 min)**  
*Mathematics Department Seminar, University of Nice, France* *March, 2017*
30. **Inversion of a spherical Radon transform in a spherical shell (50 min)**  
*Mathematics Department Seminar, Denmark Technical University, Denmark* *October, 2016*



31. **Numerical inversion of a broken ray transform arising in single scattering optical tomography (50 min)**  
*Mathematics Department Seminar, ICTS, Bangalore, India* *July, 2016*
32. **Inversion of a spherical Radon transform in a spherical shell (30 min)**  
*Mini-symposium talk at the conference*  
*"Inverse Problems: Modeling and Simulation", Turkey* *May, 2016*
33. **A Fokker-Planck approach to control collective motion (45 min)**  
*Mathematics Department Seminar, ICTS, Bangalore, India* *October, 2015*
34. **Inverse problems in imaging (50 min)**  
*Inverse Problem Seminar Series, University of Texas at Arlington, USA* *March, 2015*
35. **A variational approach to flow estimation of unsteady incompressible flows (45 min)**  
*Finite Element Meet, TIFR-CAM, Bangalore, India* *December, 2014*
36. **A discontinuous Galerkin vorticity-velocity formulation for incompressible 2D Euler flow (50 min)**  
*Mathematics Department Seminar, Indian Institute of Science Education and Research, Pune, India* *June, 2014*
37. **Optimal control approach for estimation of incompressible fluid flows (30 min)**  
*28th Annual Conference Of Ramanujam Mathematical Society,*  
*Ramaiah Institute of Technology, Bangalore, India* *June, 2013*

### Faculty Development Activities Attended

1. **4<sup>th</sup> National Teacher's Congress**  
*Maharashtra Institute of Technology World Peace University (online)* *December, 2020*
2. **National Science Foundation - Division of Mathematical Sciences (NSF-DMS) Virtual Office Hour**  
*National Science Foundation (Online)* *November, 2020*
3. **Advancing Cancer Biology at the Frontiers of Machine Learning and Mechanistic Modeling Innovation Lab**  
*National Cancer Institute-National Institutes of Health (Online)* *August, 2020*
4. **CoS CAREER Workshop**  
*University of Texas at Arlington (Online)* *May, 2020*
5. **NSF workshop on CAREER Proposals**  
*National Science Foundation (Online)* *April, 2020*
6. **National Institutes of Health, Informatics Technology for Cancer Research Teleconference**  
*National Cancer Institute-National Institutes of Health* *November, 2019*
7. **Professional Development Seminar on Teaching**  
*University of Texas at Arlington* *January, 2019*
8. **Strategic Planning Special Session**  
*University of Texas at Arlington* *November, 2018*

## Selected List of Workshops and Conferences Attended

1. **DMV Annual Meeting**  
*Online* *September, 2020*
2. **SIAM conference on imaging sciences**  
*Online* *July, 2020*
3. **12<sup>th</sup> conference of the Euro-American consortium AMiTaN'S'20**  
*Online* *June, 2020*
4. **Applied Inverse Problems**  
*University of Grenoble, France* *July, 2019*
5. **Collaborative Conference on Math-Finance and Statistics**  
*Hawaii, USA* *March, 2019*
6. **Numerical Methods for Optimal Control and Inverse Problems**  
*Technical University of Munich, Germany* *April, 2017*
7. **100 Years of the Radon Transform**  
*The Radon Institute of Computational and Applied Mathematics, Linz, Austria* *March, 2017*
8. **8<sup>th</sup> International Conference on Inverse Problems: Modeling and Simulation**  
*Turkey* *May, 2016*
9. **Conference on Computational Partial Differential Equations, Finite Element Meet**  
*TIFR-CAM, Bangalore, India* *December, 2014*
10. **Gene Golub SIAM Summer School**  
*The Radon Institute of Computational and Applied Mathematics, Linz, Austria* *August, 2014*
11. **Advanced Instructional School on Theoretical and Numerical Aspects of Inverse Problems**  
*TIFR-CAM, Bangalore, India* *June, 2014*
12. **Workshop on Optimization with PDE Constraints**  
*TIFR-CAM, Bangalore, India* *November, 2013*
13. **Summer School on Numerics and Control of PDEs**  
*Indian Institute of Science, Bangalore, India* *July-August, 2013*
14. **Compact Course on Discontinuous Galerkin Methods by Chi-Wang Shu**  
*TIFR-CAM, Bangalore, India* *July, 2013*
15. **International Conference on Conservation Laws and Applications**  
*TIFR-CAM, Bangalore, India* *July, 2013*
16. **Theoretical and Computational Aspects of Nonlinear Waves**  
*Indian Institute of Technology, Bombay, India* *May, 2013*
17. **Advanced Workshop on Non-Standard Finite Element Methods**  
*Indian Institute of Technology, Bombay, India* *February, 2013*

18. **Instructional Workshop on Finite Element Methods**  
*TIFR-CAM, Bangalore, India* *July, 2012*
19. **School on Cocompact Embeddings and Profile Decompositions**  
*TIFR-CAM, Bangalore, India* *July, 2011*
20. **Workshop on Computational Science**  
*Supercomputer Education Research Centre , Bangalore, India* *March, 2011*
21. **Mesh-Free Conference**  
*Indian Institute of Science, Bangalore, India* *March, 2011*
22. **Monsoon School on Data Assimilation Research Programme**  
*TIFR-CAM, Bangalore, India* *February, 2011*
23. **Workshop on Scientific Discovery through Intensive Data Exploration**  
*Jawaharlal Nehru Centre For Advanced Scientific Research, Bangalore, India* *January, 2011*
24. **Conference on Recent Trends in Non-Linear Elliptic PDEs** *TIFR-CAM, Bangalore, India*  
*January, 2011*
25. **Indian Institute of Science Mathematics Initiative (IMI) Workshop and Symposium on Mathematical Ecology**  
*Indian Institute of Science Education and Research, Kolkata, India* *November, 2010*
26. **International Conference of Mathematicians-Satellite Conference on Partial Differential Equations**  
*TIFR-CAM, Bangalore, India* *August, 2010*
27. **IMI Workshop and International Conference on Homogenization**  
*Indian Institute of Science, Bangalore, India* *May, 2013*
28. **Symposium on “Perspectives in Mathematics”**  
*TIFR, Mumbai, India* *November, 2009*

## Students Supervised

### Supervised postdoctoral fellows

1. **Rohit Kumar Mishra** UTA  
*Postdoctoral fellow* *September, 2019 – October, 2020*

### Supervised Ph.D. Students

1. **John Montalbo (co-supervised with Gaik Ambartsoumian)** UTA  
*Ph.D. Mathematics* *September, 2018 – July, 2020*
  - Dissertation title: Inverse problems and forward propagation of optical flow.
  - Position after Ph.D.: *Data Analyst*, Tarrant County HIV Administrative Agency, USA.
2. **Madhu Gupta** UTA  
*Ph.D. Mathematics* *September, 2019 – present*
  - Tentative dissertation title: Sparsity-based hybrid imaging and Fokker-Planck optimal control frameworks for detection and treatment of esophageal cancer.
  - Expected to graduate by August, 2023.

3. **Asma Ali Alghamdi** UTA  
*Ph.D. Mathematics* *July, 2020 – present*
  - Tentative dissertation title: Modeling of HIV dynamics and associated antiretroviral therapies using optimal control frameworks.
  - Expected to graduate by August, 2023.
4. **Mesfer Alajmi** UTA  
*Ph.D. Mathematics* *September, 2020 – present*
  - Tentative dissertation title: A game theoretic approach for modeling and assessing virotherapy-based treatments in hematologic cancers.
  - Expected to graduate by August, 2023.
5. **Hussein Said Ed Duweh** UTA  
*Ph.D. Mathematics* *September, 2020 – present*
  - Tentative dissertation title: Liouville optimal control frameworks for modeling dynamics and androgen deprivation therapies in prostate cancer.
  - Expected to graduate by August, 2023.

### Supervised Master Students

1. **Jan Bartsch**  
**(co-supervised with Alfio Borzì and Francesco Fanelli)** University of Würzburg, Germany  
*M.S. Mathematics* *September, 2016 – September, 2017*
  - Dissertation title: Optimal control problems governed by Liouville models - Theoretical analysis and implementation.
  - Position after M.S.: *Ph.D. student*, University of Würzburg, Germany.

### Supervised Undergraduate Students

1. **Achyuth Manoj**, University of Texas at Arlington, May, 2020 – current.
2. **Susanth Kakarla**, University of Texas at Arlington, June, 2020 – current.
3. **Juan Villegas**, University of Texas at Arlington, August, 2020 – current.

### Dissertation/Thesis Committee

1. Osama Alkhazaleh, Ph.D. committee (chair Yue Liu, Mathematics, UTA).
2. John Montalbo, Ph.D. committee (co-chair; chair Gaik Ambartsoumian), Mathematics, UTA.
3. Zachry Angel, Ph.D. committee (member; chair Suvra Pal), Mathematics, UTA.
4. Mohammad Alharbi, Ph.D. committee (member; chair Christopher Kribs), Mathematics, UTA.
5. Pei Wang, Ph.D. committee (member; chair Suvra Pal), Mathematics, UTA.
6. Rawan Joudeh, M.S. committee (member; chair Gaik Ambartsoumian), Mathematics, UTA.

### Teaching

## Teaching at UTA

1. **MATH 3330 (Fall 2021)** - *Introduction to Linear Algebra and Vector Spaces (undergraduate)*, University of Texas at Arlington.  
**Instructor**, Class size - 60 students. Responsibilities: lectures, office hours, assignments, 3 exams per semester.
2. **MATH 3330 (Spring 2021)** - *Introduction to Linear Algebra and Vector Spaces (undergraduate)*, University of Texas at Arlington (Hybrid 3).  
**Instructor**, Class size - 28 students. Responsibilities: lectures, office hours, assignments, 3 exams per semester.
3. **MATH 5321 (Fall 2020)** - *Applied Partial Differential Equations (graduate)*, University of Texas at Arlington (Hybrid 3).  
**Instructor**, Class size - 18 students. Responsibilities: lectures, office hours, assignments, midterms and final exams.
4. **MATH 5320 (Spring 2020)** - *Ordinary Differential Equations (graduate)*, University of Texas at Arlington (Transition to online classes mid-semester).  
**Instructor**, Class size - 12 students. Responsibilities: lectures, office hours, assignments, midterms and final exams.
5. **MATH 3319 (Fall 2019)** - *Differential Equations and Linear Algebra (undergraduate)*, University of Texas at Arlington.  
**Instructor**, Class size - about 60 students. Responsibilities: lectures, office hours, 3 exams per semester.
6. **MATH 2425 (Spring 2019)** - *Calculus 2 (undergraduate)*, University of Texas at Arlington.  
**Instructor**, Class size - about 70 students. Responsibilities: lectures, office hours, 3 exams per semester.
7. **MATH 1426 (Fall 2018)** - *Calculus 1 (undergraduate)*, University of Texas at Arlington.  
**Instructor**, Class size - about 80 students. Responsibilities: lectures, office hours, 3 exams per semester.

## Independent Study and Research Study Courses at UTA

1. **MATH 5399 (Spring 2021)** - *Research in Mathematics*, Research Study Course.
2. **MATH 5999 (Spring 2021)** - *Research in Mathematics*, Research Study Course.
3. **MATH 5399 (Spring 2021)** - *Research in Mathematics*, Research Study Course.
4. **MATH 5699 (Spring 2021)** - *Research in Mathematics*, Research Study Course.
5. **MATH 5391 (Fall 2020)** - *Introduction to Optimization*, Independent Study Course.
6. **MATH 5391 (Fall 2020)** - *Optimal Control of PDE*, Independent Study Course.
7. **MATH 5699 (Fall 2020)** - *Research in Mathematics*, Research Study Course.

## Teaching before joining UTA

1. *Mechanics (graduate) (Spring 2014)*, TIFR-CAM, Bangalore, India.  
**Teaching assistant**, Class size - about 18 students. Responsibilities: assignment and examination evaluations, supplementary lectures.
2. *Computational Partial Differential Equations (graduate) (Fall 2013)*, TIFR-CAM, Bangalore, India.  
**Teaching assistant**, Class size - about 10 students. Responsibilities: assignment and examination evaluations, supplementary lectures.

## Professional Memberships

1. Member of the *Mathematical Association of America*, 2018-present.
2. Member of the *Indian Society of Industrial and Applied Mathematics*, 2016-present.

## Service

### Professional Service

1. Chair of a session at the minisymposium titled *The Passage from Optimal Control to Differential Game Problems* at the conference *SIAM Conference on Optimization*, 2021.
2. Co-organizer of a minisymposium titled *The Passage from Optimal Control to Differential Game Problems* at the conference *SIAM Conference on Optimization*, 2021.
3. Co-chair of a session at the minisymposium *Generalized Radon Transforms and Applications* at the conference *Inverse Problems Modeling and Simulation*, Turkey, 2016.
4. Journal reviewer for
  - Inverse Problems
  - Journal of Mathematical Imaging and Vision
  - Inverse Problems in Science and Engineering
  - Applied Mathematics
  - Applied Mathematical Modeling
  - SIAM Reviews.
  - IEEE Signal Processing Letters.
  - Automatica
  - International Journal of Computer Mathematics
  - IMA Journal of Applied Mathematics
  - Journal of Ramanujan Mathematical Society
  - Exploration of Targeted Anti-tumor Therapy
  - Journal of Dynamical and Control Systems
5. Reviewer for
  - AMS Mathematical Reviews
  - Zentralblatt MATH (zbMATH)

## University Service

1. Member of the College of Science Standing Committee for Diversity, Equity and Inclusion: Undergraduate Subcommittee, UTA, December, 2020 – present.
2. Member of the Preliminary A - Mathematical Analysis Subcommittee, Department of Mathematics, UTA, December, 2020 – present.
3. Member of the Preliminary B - Pure and Applied Analysis Subcommittee, Department of Mathematics, UTA, July, 2020 – December 2020.
4. Member of the Faculty Hiring Committee, Department of Mathematics, UTA, May, 2019 – April, 2021.
5. Member of the Public Relation and Awards Committee, Department of Mathematics, UTA, May, 2019 – present.
6. Co-organizer of the Calculus Bowl, Department of Mathematics, UTA, January, 2019 – present.
7. Proctor, Preliminary A - Mathematical Analysis exam, Department of Mathematics, UTA, August, 2019.
8. Organizer of the Inverse Problems Seminar Series, UTA, January, 2015 – May, 2015.

## Articles in the Media (hyperlinks)

1. February 2018 - [Science Trends: Solving mass transportation problems using Liouville equations](#)
2. September 2017- [Eureka Alert: On a collision course with game theory](#)
3. September 2017 - [PhysOrg: On a collision course with game theory](#)
4. September 2017 - [Science Daily: On a collision course with game theory](#)
5. September 2017 - [N+1: Pedestrian traffic described using game theory](#)
6. September 2017- [Jura Forum: On a collision course with game theory](#)

## Collaborators

- Dr. Alfio Borzì, Department of Mathematics, University of Würzburg, Germany.
- Dr. Kim Knudsen, Department of Applied Mathematics and Computer Science, Denmark Technical University, Denmark.
- Dr. Mario Annunziato, Department of Mathematics, University of Salerno, Italy.
- Dr. Abderrahmane Habbal, Department of Mathematics, University of Nice, France.
- Dr. Didier Auroux, Department of Mathematics, University of Nice, France.
- Dr. Rim Gouia-Zarrad, Department of Mathematics, American University of Sharjah, UAE.
- Dr. Sunghwan Moon, Department of Mathematics, Kyungpook National University, South Korea.

- Dr. Gaik Ambartsoumian, Department of Mathematics, University of Texas at Arlington, USA.
- Dr. Hristo Kojouharov, Department of Mathematics, University of Texas at Arlington, USA.
- Dr. Benito Chen, Department of Mathematics, University of Texas at Arlington, USA.
- Dr. Suvra Pal, Department of Mathematics, University of Texas at Arlington, USA.
- Dr. Zui Pan, College of Nursing and Health Innovation, University of Texas at Arlington, USA.
- Dr. Carlos Chan, Department of Surgery, University of Iowa, USA.

### **Additional Information**

#### **Programming Skills**

- C++, PYTHON, MATLAB
- FENICS, COMSOL, DEAL.II
- PARAVIEW, VISIT
- GITHUB