

Dr. Abdul Wahab

DEPARTMENT OF MATHEMATICS
SCHOOL OF SCIENCES & HUMANITIES – NAZARBAYEV UNIVERSITY
53, KABANBAY BATYR, 010000, NUR-SULTAN, KAZAKHSTAN

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RESEARCH INTERESTS

Wave propagation and scattering in complex media, Mathematical imaging, Inverse problems, Compressed sensing, Numerical analysis of partial differential equations.

EDUCATION

Ph.D. Applied Mathematics

Oct.09 – Nov.11

Centre de Mathématiques Appliquées, École Polytechnique – ParisTech

Palaiseau, France

- **Dissertation:** Modeling and Imaging of Attenuation in Biological Media
- **Adviser:** Prof. Habib Ammari (ETH-Zürich, Switzerland)
- **Defense Committee:**
 - * *President:* Prof. Eric Bonnetier (Université Joseph Fourier, Grenoble, France)
 - * *Referee:* Prof. Otmar Scherzer (University of Vienna, Austria)
 - * *Referee:* Prof. Maitine Bergounioux (Université d'Orléans, France)
 - * *Examiner:* Prof. Josselin Garnier (Université Denis Diderot – PARIS VII, currently with École Polytechnique Paris)
 - * *Examiner:* Prof. Elie Bretin (INSA de Lyon, France)
 - * *Adviser:* Prof. Habib Ammari (École Normale Supérieure, Paris, currently with ETH-Zürich, Switzerland)

M.S. Mathematical Modeling (Numerical Analysis & PDE's)

Sep.08 – Sep.09

Lab. Jacques Louis Lions, Université Pierre & Marie Curie – PARIS VI

Paris, France

- **Internship:** Mathematical Modeling in Photoacoustic Imaging
- **Adviser:** Prof. Habib Ammari (École Polytechnique Paris, currently with ETH-Zürich, Switzerland)
- **Host Lab.:** Centre de Mathématiques Appliquées, École Polytechnique – ParisTech, France

M.Sc. Applied Mathematics

Sep.07 – Aug.08

Université Pierre & Marie Curie – PARIS VI

Paris, France

M.Sc. Mathematics

Sep.03 – Dec.05

International Islamic University

Islamabad, Pakistan

- Gold Medal, First Position, Distinction, CGPA: 4.0/4.0

MHRM (Masters in Human Resource Management)

April.19 – Mar. 21

Virtual University of Pakistan

Lahore, Pakistan

B.Sc. Mathematics & Statistics

Sep.01 – Aug.03

University of the Punjab

Lahore, Pakistan

PROFESSIONAL EXPERIENCE

Associate Professor in Mathematics

Since Oct. 20

Nazarbayev University

Nur-Sultan Kazakhstan

- **Courses Taught:**
 - * Calculus I (BS)
 - * Calculus II(BS)
 - * Discrete Mathematics (BS)
- **Administrative Assignments:**

- * Member, Teaching & Learning Committee of SSH (Since Oct. 20)
- * Member, Hiring Committee of the Department of Mathematics (Since Feb. 21)
- * Member, Graduate Admission Committee of the Department of Mathematics (Fall. 21 intake)

Associate Professor in Mathematics

National University of Science & Technology (NUST)

Jan. 20 – Sep. 20
Islamabad, Pakistan

– **Courses Taught:**

- * Integral Equations (BS Math.)
- * Group Theory (BS Math.)

– **Administrative Assignments:**

- * Member, Online Education Team (Spring 2020)

Associate Professor in Mathematics

National University of Technology (NUTECH)

Nov. 18 – Nov. 19
Islamabad, Pakistan

– **Administrative Assignments:**

- * Editor-in-Chief, NUTECH Faculty Newsletter
- * Chair, Student Life Committee
- * Member, Academic Council
- * Member, Committee on Academic Performance
- * Member, Committee on Curricula
- * Member, Committee on Academic Achievement Award Selection
- * Industrial Liaison Officer
- * Member of different task forces for designing and debating academic policies
- * Member of the task forces on joint BS Biomedical Engineering Program with Shifa Tameer-e-Millat University Islamabad

– **Courses Taught:**

- * Calculus I (B.Eng. Tech. CIVIL and IT)
- * Calculus II (B.Eng. Tech. CIVIL and IT)
- * Linear Algebra and Ordinary Differential Equations (B.Eng. Tech. Mechanical)

Associate Professor in Mathematics

University of Education Lahore, Attock Campus

Feb. 18 – Nov. 18
Attock, Pakistan

– **Administrative Assignments:**

- * **Chairperson, Department of Mathematics, UE Lahore**
- * Convener, Board of Studies for the Department of Mathematics, UE Lahore
- * Member, Board of Studies for the Division of Science and Technology, UE Lahore
- * Member, Departmental Technical Review Committee (for performance evaluation of tenure track faculty)
- * Member, Discipline Committee, Attock Campus
- * Member, Comprehensive Examination Committee for MS Mathematics (Vice Chancellor's nominee)
- * Member, Admission Committee for MS Mathematics, Fall 2018
- * Member, Assessment Team for BS Mathematics Program Evaluation, 2018

– **Courses Taught:**

- * Linear Algebra (B.S. Mathematics)
- * General Topology (B.S. Mathematics)
- * Mathematical Methods for Physics (B.S. Mathematics)

Research Fellow/Assistant Professor in Bio & Brain Engineering

Korea Advanced Institute of Science & Technology

Jan. 16 – Feb. 18
Daejeon, South Korea

- **Funding Agency:** National Research Foundation, Korea through Korea Research Fellowship (Grant No. NRF-2015H1D3A106240).
- **Project:** Sampling Theory and Applications for Inverse Scattering Problems
- **Principle Investigator:** Prof. Jong Chul Ye (Bio Imaging & Signal Processing Lab., KAIST)

Assistant Professor in Mathematics (Tenure Track)*COMSATS Institute of Information Technology*Jun.12 – Oct.15
Wah Cantt., Pakistan

– Courses Taught:

- * Advanced Partial Differential Equations (M.S. Mathematics)
- * Advanced Numerical Analysis (M.S. Mathematics)
- * Ordinary Differential Equations (B.S. Engineering, B.S. Computer Sciences)
- * Calculus & Analytic Geometry (B.S. Engineering)
- * Linear Algebra (B.S. Computer Sciences, B.S. Telecommunication & Networking)

– Courses Designed:

- * Direct & Inverse Problems in Wave Propagation (M.S./Ph.D. Mathematics, approved)
- * Mathematical Methods in Imaging (M.S./Ph.D. Mathematics, differed by BoS)

– Additional Assignments:

- * Coordinator: *Weekly Seminar Series on Mathematics & Applications* (Sep.12 – Mar.14)
- * Member: Organizing Committee of *2nd & 3rd COMSATS Mathematical Olympiad* (Feb.13 & Mar.14)
- * Member: *Departmental Thesis Advisory Committee* (Feb.13 – Jun.15)
- * Member: *Campus Unfair-Mean Control Committee* (Dec.12 – Jun.15)
- * Vice President: *French Alumni Association COMSATS* (Nov.14 – Oct.15)
- * University Coordinator: *National Academy of Young Scientists* (Jan.13 – Oct.15)

Post-Doctoral Fellow*Université Denis Diderot – PARIS VII*Dec.11 – Aug.12
Paris, France

- Funding Agency: *École Polytechnique*, Paris, France through Young Post Doctoral Fellowship
- Project: Time Reversal in Attenuating Media and Applications
- Adviser: Prof. Josselin Garnier (LPMA, Université PARIS VII, currently with CMAP, *École Polytechnique Paris*)

Doctoral Fellow*Centre de Mathématiques Appliquées, École Polytechnique – ParisTech*Oct.09 – Nov.11
Palaiseau, France

- Funding Agency: Higher Education Commission, Pakistan through Doctoral Fellowship NBS France
- Extra-Curricular Activities:
 - * Member: *Advisory Committee of Graduate School of École Polytechnique* (2010)
 - * Secretary General: *X'Doc – The Association of PhD Students of École Polytechnique* (2010)

Lecturer in Mathematics*COMSATS Institute of Information Technology*Jul.06 – Jun.07
Wah Cantt., Pakistan

– Courses Taught:

- * Ordinary Differential Equations (B.S. Computer Sciences, B.S. Telecom. & Networking)
- * Calculus & Analytic Geometry (B.S. Computer Sciences, B.S. Telecom. & Networking)
- * Discrete Mathematics (B.S. Computer Sciences, B.S. Telecom. & Networking)

Adjunct Professor*Nazarbayev University, Nur-Sultan, Kazakhstan**Aug.-Sep. 2020*

- Courses Taught: Calculus I

*Quaid-i-Azam University, Islamabad, Pakistan**Spring 2015, Fall 2019*

- Courses Taught: Advanced Calculus (M.Sc. Math.), Calculus & Analytic Geometry (B.S. Physics)

*COMSATS Institute of Information Technology, Pakistan (Virtual Campus)**Spring 2013*

- Courses Taught: Calculus (M.Sc. Mathematics); 48hrs. video lectures for distance-learning

AWARDS, FELLOWSHIPS & GRANTS**Awards**

- **Best Researcher of the Year Awards 2016 and 2017:** from Bio-Imaging and Signal Processing Lab, Department of Bio and Brain Engineering, Korea Advanced Institute of Science and Technology, Korea (awarded on 29 Dec. 2016 and 22 Dec. 2017).
- **Research Productivity Awards:** from COMSATS Institute of Information Technology, Pakistan for three consecutive academic years 2013, 2014, and 2015 (awarded in Mar.14, Mar.15 and Sep.16).
- **Gold Medal, Distinction & First Position:** from International Islamic University Islamabad, Pakistan in M.Sc. Mathematics (awarded in Jun.07).

Fellowships

- **Korea Research Fellowship:** from National Research Foundation of Korea (Jan.16 – Feb.20)
- **Young Post Doctoral Fellowship:** from École Polytechnique – ParisTech, France (Dec.11 – Aug.12)
- **Doctoral Fellowship:** from Higher Education Commission of Pakistan for M.S. leading to Ph.D. through NBS-France Program (Jun.07 – Nov.11)

Grants

- **NRF-Research Grant:** *Sampling theory and applications for inverse scattering problems* (National Research Foundation of Korea, Grant No. NRF-2015H1D3A1062400, ~ 300,000 USD, 1 Jan. 2016– 29 Feb. 2020, Co-Principle Investigator).
- **NRF-Research Grant:** *A missing link between compressed sensing and analytic reconstruction in biomedical imaging* (National Research Foundation of Korea, Grant No. NRF-2016R1A2B3008104, ~ 270,000 USD, 1 Jun. 2016–30 Mar. 2018, Participating Researcher).
- **NRF-Research Grant:** *Simultaneous multi-band dynamic compressed sensing for 4D super-resolution MRI* (National Research Foundation of Korea, Grant No. NRF-2014R1A2A1A11052491, ~ 180,000 USD, 1 Jan. 2016–31 Oct. 2016, Participating Researcher).
- **ICIAM Grant:** from the International Council for Industrial and Applied Mathematics, to attend *9th International Congress of Industrial and Applied Mathematics (ICIAM2019)* (15-19 Jul. 2019) at Valencia, Spain.
- **A3 Foresight Travel Grant:** from A3 Foresight Research Project: Modeling and Computation of Applied Inverse Problems, to attend *8th International Conference on Inverse Problems and Related Topics* (27 Jun.–1 Jul. 2015) at Seoul, South Korea.
- **HLFF Travel Grant:** from Heidelberg Laureate Forum Foundation, to attend *3rd Heidelberg Laureate Forum* (23 Aug.–28 Aug. 2015) at Heidelberg, Germany.
- **MFO Travel Grant:** from Mathematisches Forschungsinstitut Oberwolfach, to attend the workshop *Applied Harmonic Analysis and Sparse Approximation* (16 Aug.–22 Aug. 2015) at Oberwolfach, Germany.
- **ICIAM Travel Grant:** from the International Council for Industrial and Applied Mathematics, to attend *8th International Congress of Industrial & Applied Mathematics* (10–14 Aug. 2015) at Beijing, China (offer declined).
- **CIMPA Travel Grant:** from Centre International de Mathématiques Pures & Appliquées to attend CIMPA – School *Nonlinear Partial Differential Equations arising from Geometry and Physics* (20–29 Mar. 2015) at Hammamet, Tunisia (offer declined).
- **HEC Start-up Grant:** *Reflection of Plane Waves Propagating through Elastic Solid* (Higher Education Commission of Pakistan, Jan. 2015, Co-Principle Investigator, offer declined).
- **CIMPA Travel Grant:** from Centre International de Mathématiques Pures & Appliquées to attend CIMPA – Indonesia School *Mathematical and Statistical Methods for Imaging* (25 Aug.–5 Sep. 2014) at Bandung, Indonesia.
- **NANUM Travel Grant:** from National Institute for Mathematical Sciences (NIMS) Korea to attend *The International Congress of Mathematicians* (13 Aug.–21 Aug. 2014) at Seoul, South Korea.

SCHOLARLY ACTIVITIES

Research Supervision

- **Ph.D. Students Supervised:**
 - TASAWAR ABBAS, *Inverse scattering using asymptotic techniques*, International Islamic University Islamabad (IIUI), Pakistan, Co-supervised with Prof. Muhammad Sajid (IIUI), Aug.18

- **M.S. Students Supervised:**
 - SAMAN ANJUM, *On an electromagnetic inverse source problem*, COMSATS Institute of Information Technology, Pakistan, Jun.13
 - SHAISTA QAIM SHAH, *Numerical heat and mass transfer analysis of a time fractional Oldroyd-B fluid between infinite parallel plates*, COMSATS Institute of Information Technology, Pakistan, Jan.14
 - NAZMA JAVAID, *Numerical study of two dimensional unsteady flow of an anomalous maxwell fluid*, COMSATS Institute of Information Technology, Pakistan, Jun.14
 - SIKANDAR FIAZ, *Analysis of a non-Fourier anomalous biothermomechanical skin model*, COMSATS Institute of Information Technology, Pakistan, Jun.14
 - SHARMEEN SHAHID, *Unsteady flow of fractional Burgers fluids: A numerical study*, COMSATS Institute of Information Technology, Pakistan, Jun.14
- **Current Research Students:**
 - INGKAR TOLEPBERGENOVA, Nazarbayev University, Kazakhstan, Since Jan. 21

Research Invitations

- Institut Camille Jordan, Université Claude Bernard - Lyon 1, France (21–31 Jul.19), invited by Prof. Elie Bretin.
- Department of Mathematics, Hong Kong Baptist University, Hong Kong (18–24 Dec. 2017), invited by Prof. Hongyu Liu.
- Weierstrass Institute for Applied Analysis and Stochastics, Berlin, Germany (19–24 Jul. 2016), invited by Dr. Naveed Ahmed (Numerical Mathematics and Scientific Computing Group).
- Weierstrass Institute for Applied Analysis and Stochastics, Berlin, Germany (7 Aug. – 15 Aug. 2015), invited by Dr. Guanghui Hu (Nonlinear Optimization and Inverse Problems Group) and Dr. Naveed Ahmed (Numerical Mathematics and Scientific Computing Group).
- Department of Mathematics & Applications, École Normale Supérieure, Paris, France (18 May – 29 May 2015), Invited by Prof. Habib Ammari.

Conference Organization

- Member Organizing Committee: Conference on Applied Mathematics (19-21 August 2019), Lahore University of Management Sciences, Lahore, Pakistan.
- Member Organizing Committee: Conference on Applied Mathematics (22-24 May 2017), Lahore University of Management Sciences, Lahore, Pakistan.
- Co-Organizer: Symposium on Mathematical Methods for Inverse Medium Scattering (Applied Inverse Problems Conference (29 May–2 Jun. 2017), Hangzhou, China).
- Member Scientific Committee: International Conference on Differential Equations and Applications (May 26-28 2016), Lahore University of Management Sciences, Lahore, Pakistan.

Referee for

- Asymptotic Analysis (Since Feb. 21)
- Journal of Computational Physics (Since Feb. 21)
- International Journal of Computer Mathematics (Since Jun. 20)
- Computational Biology and Chemistry (Since Jun.19)
- IEEE Transactions on Neural Networks and Learning Systems (Since Dec.18)
- Neural Computing and Applications (Since Nov.18)
- Mathematical Problems in Engineering (Since Jan.18)
- IEEE Transactions on Medical Imaging (Since Sep.17)
- Inverse Problems (Since Jun.17)
- Advances in Mechanical Engineering (Since Mar.17)
- SIAM Journal on Imaging Sciences (Since Feb.17)
- Boundary Value Problems (Since Jan.17)
- Advanced Device Materials (Since Jan.17)
- Inverse Problems and Imaging (Since Oct.16)
- IEEE Transactions on Computational Imaging (since Dec.15)
- Mathematical Reviews of American Mathematical Society (since Apr.14)

- Inverse Problems in Science & Engineering (since Nov.13)
- Mathematical Methods in the Applied Sciences (since Nov.12)
- Journal of Computational Mathematics (since Dec.11)
- Contemporary Mathematics (book series) of American Mathematical Society (since Dec.11)

Miscellaneous

- Invited Young Researcher: 3rd Heidelberg Laureate Forum, Germany (23 Aug. – 28 Aug. 2015).
- Panelist: Strategic Planning Session for Promotion of Mathematics in OIC Member States, by COMSTECH (The OIC's Standing Committee on Scientific and Technological Cooperation), Islamabad, Pakistan (8 Jan. 2015).
- Observer: Symposium MENAO – Mathematics in Emerging Nations: Achievements and Opportunities by International Mathematical Union and Commission for Developing Countries, Seoul, South Korea (12 Aug. 2014)

SIGNIFICANT SCIENTIFIC CONTRIBUTIONS

- Designed deep learning based frameworks for inverse problems in mathematical imaging.
- Designed elastic scattering coefficients for the resolution of direct and inverse elastic scattering problems and enhancement of nearly elastic cloaking.
- Designed efficient non-iterative joint sparse recovery frameworks for optical, elastic and electromagnetic inverse scattering problems for detection and characterization of diametrically small inclusions beyond Born and Rytov limits.
- Laid mathematical foundations of time-reversal techniques for inverse source problems associated with attenuating acoustic waves, elastic and viscoelastic waves and weakly dissipative electromagnetic waves thereby compensating for the effects of attenuation in imaging.
- Developed and analyzed asymptotic frameworks for elastic and electromagnetic imaging based on topological gradients and introduced weighted imaging paradigm.
- Provided an inception of image reconstruction algorithms for attenuating media, especially biological materials and soft tissues.

TALKS IN CONFERENCES & SEMINARS

- **Deep elastography: A mathematical framework (Keynote Speaker)**, *NUST- Conference on Recent Trends in Mathematical Sciences*, National University of Sciences and Technology (NUST), Pakistan (22-23 Dec. 2020).
- **Mathematics for Imaging (Invited Speaker)**, *NUST- Webinar Series 2020*, NUST School of Natural Sciences (SNS), Pakistan (21 Aug. 2020).
- **Acoustic source reconstruction using time-reversal and cross correlations**, *Seminars of Department of Mathematics, School of Natural Sciences*, National University of Sciences and Technology (NUST), Pakistan (11 Mar. 2020).
- **A model based joint sparsity approach for inverse elastic medium scattering**, *5th International Conference on Numerical Analysis and Optimization*, Sultan Qaboos University, Muscat, Oman (6-9 Jan. 2020).
- **Deep learning for elastic source imaging**, *9th International Congress on Industrial and Applied Mathematics (ICIAM 2019)*, Universitat de Valencia (Spain), (15-19 Jul. 2019).
- **A model based joint sparsity approach for inverse elastic medium scattering (Invited Speaker)**, *7th International Conference on Recent Developments in Fluid Mechanics & Environmental Sciences*, International Islamic University Islamabad, Pakistan (13-15 Feb. 2018).

- **A model based joint sparsity approach for inverse elastic medium scattering (Invited Speaker)**, Colloquium of *Department of Mathematics*, Hong Kong Baptist University, Kowloon, Hong Kong (20 Dec. 2017).
- **Compressive sensing based elasticity imaging (Invited Speaker)**, Seminars of *Abdus Salam School of Mathematical Sciences*, G. C. University Lahore, Pakistan (5 Oct. 2017).
- **A sparsity driven algorithm for elasticity imaging (Invited Speaker)**, *KSIAM 2017 Spring Conference*, Seoul University, Seoul, S. Korea (23–24 Jun. 2017).
- **Joint sparsity based elasticity imaging with underdetermined measurements (Invited Speaker)**, *Applied Inverse Problems*, Hangzhou, China (29 May – 2 Jun. 2017).
- **A sparsity driven imaging algorithm for elastography (Invited Speaker)**, *Conference on Applied Mathematics*, CASM, Lahore University of Management Sciences, Pakistan (22–24 May 2017).
- **A joint sparsity algorithm for inverse elastic medium scattering (Invited Speaker)**, *Composites, Metamaterials, and Inverse Problems*, Korea Advanced Institute of Science and Technology (KAIST), Daejeon, South Korea (13–15 Dec. 2016).
- **Elastic scattering coefficients**, *OSA's Imaging and Applied Optics (Imaging) Congress*, Kongresshaus Stadthalle Heidelberg, Germany (25–28 Jul. 2016).
- **A non-iterative algorithm for elastography using joint sparsity (Invited Speaker)**, Seminars of *Weierstrass Institute for Applied Analysis and Stochastics*, Berlin, Germany (21 Jul. 2016).
- **On the notion of elastic scattering coefficients**, *8th International Conference on Inverse Problems and Related Topics*, Seoul, South Korea (27 Jun.–1 Jul. 2016).
- **Elastic scattering coefficients and their role in elastic scattering (Invited Speaker)**, *International Conference on Differential Equations and Applications*, CASM, Lahore University of Management Sciences, Pakistan (26–28 May 2016).
- **Time reversal and cross correlation techniques for inverse source problems (Invited Speaker)**, Seminars of *Department of Mathematics, Korea Advanced Institute of Science & Technology*, Daejeon, South Korea (7 Mar. 2016).
- **Time reversal for inverse source problems (Invited Speaker)**, Seminars of *Weierstrass Institute for Applied Analysis and Stochastics*, Berlin, Germany (11 Aug. 2015).
- **Topological derivative based imaging of electromagnetic inclusions (Invited Speaker)**, *Qualitative and Quantitative Techniques for Differential Equations and Applications*, CASM, Lahore University of Management Sciences, Pakistan (4–6 June 2015).
- **Far field imaging of a dielectric inclusion**, *5th International Workshop on New Computational Methods for Inverse Problems*, Institut Farman, École Normale Supérieure de Cachan, Cachan, France (29 May 2015).
- **Imaging of small electromagnetic inclusions (Invited Speaker)**, *Sixth International Conference on Recent Developments in Fluid Mechanics*, SNS, National University of Sciences and Technology, Islamabad, Pakistan (17–19 May. 2015).
- **Time reversal imaging in attenuating media (Invited speaker)**, *International Workshop on Current Developments and Applications of Mathematical Sciences*, COMSTECH, Islamabad, Pakistan (5–7 Jan. 2015).
- **Mathematical methods for imaging: Time reversal, Elasticity imaging, Modeling attenuation in tissue imaging (3 Invited lectures of 1.5 hours each)**, *CIMPA School - Mathematical and Statistical Methods for Imaging*, Institut Teknologi Bandung, Indonesia (25 Aug. – 05 Sep. 2014).
- **Asymptotic analysis of topological derivative based elasticity imaging functionals**, *The International Congress of Mathematicians 2014*, Seoul, South Korea (13–21 Aug. 2014).

- **Revisiting time reversal for attenuating media (Invited Speaker)**, *Imaging, Multi-scale & High Contrast PDEs*, Seoul-ICM 2014 Satellite Conference, National Institute for Mathematical Sciences (NIMS), Daejeon, South Korea (7–9 Aug. 2014).
- **Mathematical algorithms for photoacoustic imaging**, Symposium on *Computational Complexities, Innovation and Solutions, Technomoot-2014*, COMSATS Institute of Information Technology, Abbottabad, Pakistan (12–13 May 2014).
- **Revisiting topological derivative based imaging (Invited Speaker)**, Seminars of *Department of Mathematics*, COMSATS Institute of Information Technology, Islamabad, Pakistan (31 Mar. 2014).
- **On topological derivative based techniques in imaging**, Seminars of *Center for Advanced Studies in Mathematics*, Lahore University of Management Sciences, Lahore, Pakistan (17 Feb. 2014).
- **Analysis of topological derivative based imaging functionals**, *Second Conference on Mathematical Sciences*, International Islamic University, Islamabad, Pakistan (1–5 Nov. 2013).
- **Analysis of topological derivative based optimization techniques in imaging**, *6th World Conference on 21st Century Mathematics*, Abdus Salam School of Mathematical Sciences, G.C. University Lahore, Pakistan (6–9 Mar. 2013).
- **Mathematics to see the invisible: Wave imaging and applications**, *Seminar Series on Mathematics & its Applications*, Department of Mathematics, COMSATS Institute of Information Technology, Wah Cantt. Pakistan (23 Oct. 2012).
- **Time reversal and Radon transform based reconstruction algorithms for Photo-acoustic imaging**, *Two Days Conference of Mathematical Sciences*, International Islamic University, Islamabad, Pakistan (19–20 Oct. 2012).
- **Time reversal techniques in wave imaging and applications (Invited Speaker)**, Seminars of *Centre for Advanced Mathematics & Physics*, National University of Science & Technology, Islamabad, Pakistan (18 Apr. 2012).
- **Time reversal algorithms for inverse source problems**, *Inverse Problems, Control and Shape Optimization (PICOF'12)*, École Polytechnique, Palaiseau, France, (2–4 Apr. 2012).
- **Attenuation in photoacoustic imaging**, *IONS'11–(Optical Society of America)*, Paris, France, (22–25 Feb. 2012).
- **Modeling and imaging of wave attenuation (Invited Speaker)**, *Seminars on Mathematical Methods for Imaging*, École Normale Supérieure (ENS), Paris, France (18 Nov. 2011).
- **On inverse source problems in attenuating acoustic media**, *Recent Advances in Mathematical Methods, Models and Applications*, Center for Advanced Studies in Mathematics, Lahore University of Management Sciences, Pakistan (16–17 Apr. 2011).
- **On inverse source problems in attenuating acoustic media**, *Seminars of Ph.D. Students*, Centre de Mathématiques Appliquées, École Polytechnique, Palaiseau, France (16 Mar. 2011).
- **Imaging in dissipative media**, *Seminars of Ph.D. Students*, Centre de Mathématiques Appliquées, École Polytechnique, Palaiseau, France (7 Apr. 2010).
- **Source localization problems in attenuating media**, Poster No. 49, *Forum Digiteo*, École Polytechnique, Palaiseau, France (18 Oct. 2011).

SCIENTIFIC PUBLICATIONS

Books

- B1. H. Ammari, E. Bretin, J. Garnier, H. Kang, H. Lee, and A. Wahab¹, *Mathematical Methods in Elasticity Imaging*, Princeton Series in Applied Mathematics, Princeton University Press, New Jersey, USA, 2015, ISBN: 9781400866625.

¹Alphabetical ordering of authors

Book Chapters

- C3. M. Afzal, M. Ayub, R. Nawaz, and A. Wahab^{1,2}, Mode-matching solution of a scattering problem in flexible waveguide with abrupt geometric changes, in *Imaging, Multiscale and High Contrast Partial Differential Equations*, Contemporary Mathematics, vol. 660, pp. 113–129, American Mathematical Society, Providence, USA, 2016.
- C2. H. Ammari, E. Bretin, J. Garnier, and A. Wahab¹, Time reversal in attenuating acoustic media, in *Mathematical and Statistical Methods for Imaging*, Contemporary Mathematics, vol. 548, pp. 151–163, American Mathematical Society, Providence, USA, 2011.
- C1. E. Bretin and A. Wahab^{1,2} Some anisotropic viscoelastic Green functions, in *Mathematical and Statistical Methods for Imaging*, Contemporary Mathematics, vol. 548, pp. 129–149, American Mathematical Society, Providence, USA, 2011.

Preprints

- S4. S. Park, S. Khan, and A. Wahab, E3-targetPred: Prediction of E3-target proteins using deep latent space encoding, In Revision: *IEEE/ACM Transactions on Computational Biology and Bioinformatics*, Jun. 2020.
- S3. S. Khan, M. Usman, and A. Wahab¹, AFP-SRC: Identification of antifreeze proteins using sparse representation classifier, In Revision: *Neural Computing and Applications*, Oct. 2020.
- S2. A. Wahab², S. Khan, and F. Z. Khan, Comments on “Design of momentum fractional LMS for Hammerstein nonlinear system identification with application to electrically stimulated muscle model”, Submitted to: *The European Physical Journal Plus*, Sep. 2020.
- S1. M. Afzal, J. U. Satti, A. Wahab, R. Nawaz, Scattering analysis of a partitioned wave-bearing cavity with material contrast, Submitted to *Nonlinear Dynamics*, Jan. 2021.

Journal Articles

- A28. M. Afzal, S. Shafique, and A. Wahab¹, Analysis of traveling waveform of flexible waveguides containing absorbent material along flanged junctions, *Communications in Nonlinear Science and Numerical Simulation*, 97:(2021), 105737.
- A27. H. Liu, W. Y. Tsui, A. Wahab¹, and X. Wang, Three-dimensional elastic scattering coefficients and enhancement of the elastic near cloaking, *Journal of Elasticity*, 143(2021), 111-146.
- A26. S. Khan, A. Wahab², I. Naseem, and M. Moinuddin, Comments on “Design of fractional-order variants of complex LMS and NLMS algorithms for adaptive channel equalization”, *Nonlinear Dynamics*, 101(2):(2020), pp. 1053-1060.
- A25. J. Yoo, S. Sohail, D. Heo, K. H. Kim, A. Wahab, Y. Choi, S.-I Lee, E. S. Chae, H. H. Kim, Y. M. Bae, Y. Choi, S. Cho, and J. C. Ye, Deep learning diffuse optical tomography, *IEEE Transactions on Medical Imaging*, 39(4):(2020), pp. 877-887.
- A24. A. Wahab² and S. Khan, Comments on “Fractional extreme value adaptive training method: Fractional steepest descent approach”, *IEEE Transactions on Neural Networks and Learning Systems*, 31(3):(2020), pp. 1066-1068.
- A23. J. Yoo, A. Wahab², and J. C. Ye, A mathematical framework for deep learning in elastic source imaging, *SIAM Journal on Applied Mathematics*, 78(5):(2018), pp. 2791-2818.
- A22. T. Abbas, S. Khan, M. Sajid, A. Wahab^{1,2}, J. C. Ye, Topological sensitivity based far-field detection of elastic inclusions, *Results in Physics*, 8(1): (2018), pp. 442-460.
- A21. N. Muhammad, N. Bibi, A. Wahab, Z. Mahmood, T. Akram, S. R. Naqvi, S. H. Oh, and D. G. Kim, Image de-noising with subband replacement and fusion process using Bayes estimators, *Computers and Electrical Engineering*, 70: (2018), pp. 413-427.
- A20. J. Lim, A. Wahab, G. Park, K. Lee, Y. Park, and J. C. Ye, Beyond Born-Rytov limit for super-resolution optical diffraction tomography, *Optics Express*, 25(24): (2017), pp. 30445–30458.

²Corresponding author

- A19. A. Rasheed, A. Kausar, A. Wahab, and T. Akbar, Stabilized approximation of steady flow of third grade fluid in presence of partial slip, *Results in Physics*, 7: (2017), pp. 3181–3189.
- A18. J. Yoo, Y. Jung, M. Lim, J. C. Ye, and A. Wahab², A Joint sparse recovery framework for accurate reconstruction of inclusions in elastic media, *SIAM Journal on Imaging Sciences* 10(3): (2017), pp. 1104–1138.
- A17. T. Abbas, H. Ammari, G. Hu, A. Wahab^{1,2}, and J. C. Ye, Two-dimensional elastic scattering coefficients and enhancement of nearly elastic cloaking, *Journal of Elasticity*, 28(2): (2017), pp. 203–243.
- A16. A. Wahab², T. Abbas, N. Ahmed, and Q. M. Z. Zia, Detection of electromagnetic inclusions using topological sensitivity, *Journal of Computational Mathematics*, 35(5): (2017), pp. 642–671.
- A15. A. Rasheed, A. Wahab, S. Q. Shah, and R. Nawaz, Finite difference-finite element approach for solving fractional Oldroyd-B equation, *Advances in Difference Equations*, 2016: (2016), 236.
- A14. A. Wahab and R. Nawaz, A note on elastic noise source localization, *Journal of Vibration & Control*, 22(7):(2016), pp. 1889–1894.
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In Preparation

D1. Performance analysis of fractional learning systems (with S. Khan, I. Naseem, and J. Ye).

PERSONALIA

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HOBBIES

- Photography, Cooking and Poetry.
- Traveling: France (Jun.07-Jun.12), Saudi Arabia (Jun.08), Switzerland (Jul.09), China (Aug.14), South Korea (Aug.14), Indonesia (Sep.14), Qatar (Sep.14), France (May 15), Germany (Aug.15), Czech Republic (Aug.15), France (Aug. 15), United Arab Emirates (Dec.15), South Korea (Dec.15 - Feb.18), Germany (Jul.16), United Arab Emirates (Jan.17), China (May 17), Hong Kong (Dec.17), Saudi Arabia (Feb.-Mar. 19), Spain (Jul.19), France (Jul. 19), Oman (Jan.20), Kazakhstan (Sep.20-).