Dr. Abdul Wahab

Department of Mathematics
College of Science – Sultan Qaboos University
Al-Khod 123, P.O. Box 36, Muscat, Oman

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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. Maïtine 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

M.HRM (Masters in Human Resource Management) Apr.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 Jan.24
Sultan Qaboos University *Muscat, Oman*

- `Courses Taught:`
  - Discrete Mathematics for Computer Science (BS)
  - Linear Algebra II (BS)

Associate Professor in Mathematics Oct.20–Feb.24
Nazarbayev University *Nur-Sultan, Kazakhstan*

- `Courses Taught:`
  - Calculus I (BS)
  - Calculus II(BS)
  - Discrete Mathematics (BS)
  - Introduction to Differential Equations (BS)
  - Real Analysis I (BS)
  - Integral Equations (BS)
- `Administrative Assignments:`
  - Member, Ph.D. Admission and Curriculum Committee of Dept. of Math. (Aug.-Dec.23)
  - Member, Ad-hoc Committee on ABET Accreditation of Dept. of Math. (Mar.-Aug.23)
  - Member, Hiring Committee, SSH (Jun.22)
  - Member, Teachning & Learning Committee of SSH (Oct.20-Aug.23)
  - Member & Chair, Undergraduate Curriculum Committee, Dept. of Math. (Oct.22 & Aug.-Dec.23)
  - Member, Ph.D. Curriculum Committee, Dept. of Math. (Jul.22- Jul.23)
  - Coordinator, Al-Farabi Research Seminars Series of the Dept. of Math. (Spring 22)
  - Member, Screening Committee of the Dept. of Math. (Feb.-Sep.21 & Jul.22 —Jul.23)
  - Member, Graduate Admission Committee of the Dept. of Math. (Fall.21 intake)

Associate Professor in Mathematics Jan.20 – Sep.20
National University of Science & Technology (NUST) *Islamabad, Pakistan*

- `Courses Taught:`
  - Integral Equations (BS Math.)
  - Group Theory (BS Math.)
- `Administrative Assignments:`
  - Member, Online Education Team (Spring 2020)

Associate Professor in Mathematics Nov.18 – Nov.19
National University of Technology (NUTECH) *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 force 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 Feb.18 – Nov.18
University of Education Lahore, Attock Campus *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 Jan.16 – Feb.18
Korea Advanced Institute of Science & Technology *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) Jun.12 – Oct.15
COMSATS Institute of Information Technology *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 Dec.11 – Aug.12
Université Denis Diderot – PARIS VII *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 Oct.09 – Nov.11
Centre de Mathématiques Appliquées, École Polytechnique – ParisTech *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 Jul.06 – Jun.07
COMSATS Institute of Information Technology *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/Visiting Professor Aug.–Sep.20
Nazarbayev University *Nur-Sultan, Kazakhstan*

– `Courses Taught:` Calculus I

Quaid-i-Azam University, Islamabad, Pakistan *Spring 15, Fall 19*

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

COMSATS Institute of Information Technology, Pakistan (Virtual Campus) *Spring 13*

– `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)

Research Grants

– `Social Policy Grant:` *Electromagnetic wave prospecting for perfectly conducting objects buried in layered media* (Nazarbayev University, Kazakhstan, 10,000 USD, Jul. 2022– Jul. 2023, Principle Investigator).

– `Faculty Development Competitive Research Grant:` *Properties and applications of elastic scattering coefficients* (Nazarbayev University, Kazakhstan, Grant No. 11022021FD2914, 135,263 USD, Jan. 2022– Dec. 2024, Principle Investigator).

– `NRF-Research Grant:` *Sampling theory and applications for inverse scattering problems* (National Research Foundation of Korea, Grant No. NRF-2015H1D3A1062400, $\sim$ 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, $\sim$ 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, $\sim$ 180,000 USD, 1 Jan. 2016–31 Oct. 2016, Participating Researcher).

Travel Grants

– `Chebyshev Grant:` from the International Mathematical Union, to attend *The International Congress of Mathematicians)* (5-14 Jul. 2022) at Saint Petersburg, Russia (Congress was held virtually due to political unrest).

– `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

- `Current and Former Post docs.:`
  - Dr. Rab Nawaz (Aug. 1–31, 2022), *Currently, Associate Professor at COMSATS University Islamabad, Pakistan*
  - Dr. Muhammad Imran Anwar (Jun. 20 – Sep. 19, 2022), *Currently, Professor at Govt. Collage Jhang, Pakistan*
  - Dr. Farrukh Zeeshan Khan (Nov. -13 – Dec. 31, 2023), *Currently, Assistant Professor at University of Engineering and Technology, Taxila, Pakistan*
- `Ph.D. Students Supervised:`
  - Tasawar Abbas, *Inverse scattering using asymptotic techniques*, International Islamic University Islamabad (IIUI), Pakistan, Co-supervised with Prof. Muhammad Sajid (IIUI), Referees: **Prof. Hongyu Liu** (Hong Kong Baptist University) and **Prof. Hyundae Lee** (INHA University, S. Korea), Aug.18
  - Aisha Tursynkozha, Ph.D. student at Nazarbayev University, Kazakhstan, Since May 22 (Co-supervised with Prof. Ardak Kashkynbayev).
- `M.S. Students Supervised:`
  - Aibike Nagyz, *Electromagnetic prospecting of buried targets using topological sensitivity*, Nazarbayev University, Kazakhstan, Jun.24
  - 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
- `Research Assistants:`
  - Sanat Shukarov, Research Assistant at Nazarbayev University, Kazakhstan, Jul.23-Sep.23.
  - Kishwat Ejaz Malik, Research Assistant at Nazarbayev University, Kazakhstan, Aug.-Dec.22.
  - Muhammad Safdar, Research Assistant at Nazarbayev University, Kazakhstan, Jul.22-Dec.23.
  - Tamirlan Mukazhanov, BS. student at Nazarbayev University, Kazakhstan, Sep.22-May23.
  - Azamat Kassimbekov, BS. student at Nazarbayev University, Kazakhstan, Aug.22-May23.
  - Vladislav Ryspayev, BS. student at Nazarbayev University, Kazakhstan, Since Sep.22-Dec.23.
  - Daniiar Suiunbekov, BS. student at Nazarbayev University, Kazakhstan, Sep.22-Dec.23.

– Bauyrzhan Kurmangaliyev, BS. student at Nazarbayev University, Kazakhstan, Oct.23-Dec.23.

Research Invitations

- Suleyman Demirel University, Almaty, Kazakhstan (31 Jul–4 Aug.23), invited by Prof. Shirali Kadyrov.
- University of Doha for Science and Technology, Doha, Qatar (4–14 May 23), invited by Dr. Ramzan Ali.
- Sultan Qaboos University, Sultanate of Oman (8–14 Feb.23), invited by Dr. Samir Karaa.
- 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.

Editorial Services:

- Guest Editor: Frontiers in Physiology.
  - Special Edition: Artificial Intelligence in Bioimaging and Signal Processing.
  - June-Dec. 2022.

Referee for

- International Journal of Mechanics and Materials in Design (Since Nov. 23)
- Chaos, Solitons & Fractals (Since Oct. 23)
- SIAM Journal on Applied Mathematics (Since Oct.23)
- Neural Networks (Since Jul. 23)
- Alexandria Engineering Journal (Since Jan. 23)
- Computer Mathematics with Applications (Since Jun. 22)
- Electronic Research Archives (Since Dec. 21)
- SIAM Journal on Mathematical Analysis (Since Sep.21)
- 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 – 28 Aug.15).
- 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.15).
- Observer: Symposium MENAO – Mathematics in Emerging Nations: Achievements and Opportunities by International Mathematical Union and Commission for Developing Countries, Seoul, South Korea (12 Aug.14)

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

- **Multipolar acoustic source reconstruction using multi-frequency sparse measurements**, International Conference on Recent Trends in Mathematics (ICM-SQU2024), Muscat, Oman `(4-6 Mar.24)`.
- **Multipolar acoustic source reconstruction using multi-frequency sparse measurements (Invited Speaker)**, NUST Conference on Recent Trends in Mathematical Sciences-IV (RTMS-IV), Islamabad, Pakistan `(4-5 Mar.24, Hybrid)`.
- **A deep-learning time-reversal algorithm for inverse elastic source problems (Invited Speaker)**, Seminars of the Department of Mathematics, Nazarbayev University, Kazakhstan `(1 Sep.23)`.
- **Reconstruction of multipolar acoustic sources using sparse measurements**, 10th International Congress on Industrial and Applied Mathematics 2023, Tokyo, Japan `(20-25 Aug.23)`.
- **A physics-driven deep learning approach for inverse source problems in elasticity (Keynote Speaker)**, International Conference on Computing, Mathematics, and Engineering Technologies - iCoMET 2023, Sukkur IBA University, Pakistan `(17-18 Mar.23)`.

- **A physics-driven deep learning approach for inverse source problems in elasticity (Invited Speaker)**, Seminars of *Department of Mathematics, Sultan Qaboos University*, Muscat, Sultanate of Oman (9 Feb. 2023).
- **Inverse Elastic Medium Scattering Using Sparsity (Invited Speaker)**, Seminars of *Department of Mathematics, School of Natural Sciences*, National University of Sciences and Technology (NUST), Pakistan (13 Oct. 2021).
- **Introduction to Mathematical Imaging (Invited Speaker)**, *University of Wah - Webinar Series 2021*, Department of Mathematics, University of Wah, Pakistan (6 Sep. 2021).
- **Deep elastography: A mathematical framework**, *Emerging Trends in Pure and Applied Mathematics*, University of Bahrain, Bahrain (21-22 Jun. 2021).
- **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. Wahab[1], *Mathematical Methods in Elasticity Imaging*, Princeton Series in Applied Mathematics, Princeton University Press, New Jersey, USA, 2015, ISBN: 9781400866625.

Book Chapters

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