SACHAL HUSSAIN

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EDUCATION

PhD in Biomedical Engineering December 2020 - January 2024
Alma Mater Studiorum Universita di Bologna Bologna, Italy
PhD Dissertation: A framework to quantify the 3D left atrium wall motion model on a patient specific basis, in atrial fibrillation patients.
Major subjects: Advanced image processing, Cardiac electrophysiology, Electrophysiology & Atrial fibrillation.
PersonalizeAF project – under Horizon Europe 2020 Marie Skłodowska-Curie grant.

Master in Biomedical Engineering September 2018 - September 2019
Mines Saint-Etienne, Saint Etienne, France
Major subjects: Image processing, Healthcare engineering, Medical diagnosis tools.

Bachelor in Mechatronics Engineering September 2009 - June 2013
University of Engineering & Technology, Lahore, Pakistan
Major subjects: Embedded systems, Robotics, Control systems.

KEY SKILLS

- **Image processing:** ITK-Snap, 3D Slicer
- **STL manipulators:** Meshmixer, Magics
- **CAD:** RhinoCAD/Matrix 6.3
- **Programming:** MATLAB
- 3D printer operation & maintenance
- MS Office
- 3D printing anatomical models
- Scientific & technical report writing

RESEARCH GRANTS

- Awarded the **Marie Skłodowska-Curie Actions (MSCA) COFUND** grant to conduct postdoctoral research for three years under the SYS-LIFE project at the University of Turku.
- Awarded the most prestigious **Marie Skłodowska-Curie grant** for PhD research.

ACADEMIC ACHIEVEMENTS

- Received the **Seal of Excellence** in the Marie Skłodowska-Curie Actions (MSCA) Postdoctoral Fellowships 2025.
- Received Best E-poster award at **CSI Focus LAA 2023 conference**.
- Awarded a university-funded stipend to conduct research the master's thesis project

RESEARCH & ACADEMIC EXPERIENCES

University of Turku **Turku, Finland**
Senior Researcher May, 2026 - present
- Conducting research on cardiac image analysis and atrial fibrillation assessment using medical imaging data.
- Developing machine learning and image processing frameworks for cardiac applications.
- Collaborating with multidisciplinary research teams and clinical partners.
- Contributing to scientific publications, research dissemination, and student supervision.

Riphah International University (I14-campus) **Islamabad, Pakistan**
Assistant Professor September, 2025 - March 2026
- Delivered undergraduate courses including Medical Device Quality Systems & Standards and Image Processing.
- Designed and conducted lectures, quizzes, assignments, and practical learning activities
- Supervised final year projects with emphasis on medical image processing & healthcare technologies
- Mentored students in academic and research activities to promote analytical thinking.

HITEC University **Taxila, Pakistan**
Assistant Professor September, 2024 - September 2025

- Taught biomedical engineering courses including Microprocessor Interfacing techniques & Medical Device Quality Management Systems.
- Organized course delivery, laboratory activities, assessments, and student evaluations.
- Coordinated and supervised undergraduate final year projects from proposal development to final evaluation.

University of Bologna **Cesena, Italy**
Research Fellow December, 2020 - January 2024
- Successfully concluded PersonalizeAF project, funded by Marie Sklodowska-Curie actions ITN H2020.
- Processed and analyzed 30 dynamic cardiac CT datasets using MATLAB to devise a framework for the assessment of left atrium contractility.
- Developed and tested an image based algorithm to perform the quantitative analysis of the mechanical contraction of left atrium and left atrial appendage in atrial fibrillation patients.
- Collaborated with different research groups in Spain, Germany and Norway and published scientific article.

Simula Research Center **Oslo, Norway**
Research Fellow September, 2023 - November 2023
- Performed CFD simulation of patient-specific aorta model.
- Prepared and Pre-processed anatomical models for simulation.
- Executed CFD simulation of left atrium model throughout the cardiac cycle in static as well as in moving domains to assess atrial fibrillation.

Universitat Klinikum Freiburg **Freiburg, Germany**
Research Fellow December, 2022 - February 2023
- Validated atrial regionalization methodology for advanced cardiac analysis.
- Computed contraction parameters across distinct regions of the left atrium in atrial fibrillation patients.
- Developed a centerline-based approach for the left atrial appendage.

Hospital clinic de Barcelona **Barcelona, Spain**
Research Fellow April, 2022 - June 2022
- Implemented left atrial regionalization methodology on 30 dynamic CT data using MATLAB.
- Developed an innovative left atrial appendage analysis tool and rigorously tested on 30 left atrial appendage patient specific models.
- Attended multiple pulmonary vein isolation ablation procedures to gain insights into cardiac interventions.

CHU Hospital **Clermont Ferrand, France**
Research Internee March, 2019 - August 2019
- Collaborated closely with clinicians to analyze and process neuro-imaging data.
- Achieved precise neuro-image registration using Amira.
- Prepared detailed brain model for 3D printing using Slicer3D and Meshmixer.
- Accomplished 3D printing of brain model using Ultimaker 2+.
- Wrote comprehensive scientific reports & presented research outcomes in weekly meetings.

INDUSTRIAL EXPERIENCE

N. H Workshop **Faisalabad, Pakistan**
3D Printer Engineer April, 2014 - August, 2018
- Successfully developed anatomical models from imaging data (CT,MRI) using Invesalius.
- Designed 1000+ mechanical and jewelry designs for 3D printing using RhinoCAD & Matrix 6.0.
- Accomplished 3D printing of 1000+ designs on Projet1200 and Omaker SLA 3d printer.
- Exhibited proficiency in editing and repairing STL files in Netfabb & Meshmixer.
- Established expertise in operating & maintaining SLA/DLP 3D printers, coupled with adept post-processing of 3D printed parts, contributing to a seamless workflow, and ensuring high-quality outcomes.

PUBLICATIONS & CONFERENCES

Book chapter

· **Hussain Sachal (co-author)**," *Computational fluid dynamics simulations to deepen understanding of the haemodynamic underlying atrial fibrillation and improve therapeutic approaches*" published in Open Access book "Computational Fluid Dynamics - Analysis, Simulations, and Applications" by IntechOpen (2024): DOI

Journal publications

- **Hussain Sachal (co-author)**, et al. "*Regionalization of the atria for 3D electro-anatomical mapping, cardiac imaging, and computational modelling. A Clinical Consensus Statement of the European Heart Rhythm Association of the ESC with the collaboration of the European Association of Cardiovascular Imaging of the ESC*", Europace (2025): DOI
- **Hussain Sachal**, et al "*Patient-specific left atrium contraction quantification associated with atrial fibrillation: a region-based approach*", Computer Methods and Programs in Biomedicine (2024): DOI

Oral presentations

- **Hussain Sachal**, et al. "*Left Atrial Appendage Contraction Analysis: A Preliminary Test on Atrial Fibrillation Patients*", Computing in Cardiology, Atlanta, USA (2023)
- **Hussain Sachal**, et al. "*Regional Segmentation of the Left Atrium: A Preliminary Test in Atrial Fibrillation Patients*", Computing in Cardiology, Tampere, Finland (2022)

Poster presentations

- **Hussain Sachal**, et al. "*Left Atrial Appendage Contraction Analysis in AF patients*", CSI Focus LAA, Frankfurt, Germany (2023)
- **Hussain Sachal**, et al. "*An automatic approach for left atrium regional segmentation in atrial fibrillation patients by including anatomical variations in pulmonary veins and appendage*", iHeart – Modeling the cardiac function, Cetraro, Italy (2022)