# Raees Ahmad

Computational Physicist / Navigation Algorithm Designer
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Personal Portfolio
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## Profile

A highly motivated and research oriented Computational Physicist with interest in Inertial & Integrated Navigation Algorithm Design & Development, Kalman Filtering & Nonlinear State Estimation, Fault Detection & Isolation, Satellite Navigation and Flight Vehicle Navigation, Guidance and Control. Passionate and committed to continuous personal development, embracing challenges, and contributing innovative solutions to advance organizational goals.

## Education

**Master of Philosophy in Physics** — 12/2011 – 11/2013
*PIEAS, Islamabad* — Islamabad, Pakistan
CGPA: 3.96/4.0, Cum Laude
Thesis title: Attitude and Heading Refrence System (AHRS) aided by magnetometer

**Bachelor of Study in Physics** — 09/2007 – 12/2011
*University of Gujrat* — Gujrat, Pakistan
CGPA: 3.62/4.0 (78.67 %)

**FSc. Pre-Engineering** — 2005 – 2007
*Government Science College, Gujrat* — Gujrat, Pakistan
Division: 1st

**Matric (Science)** — 2003 – 2005
*Government High School Hajiwala Gujrat* — Gujrat, Pakistan
Division: 1st

## Professional Experience

**Navigation Algorithm Designer/Developer** — 11/2013 – present
*A Public Sector R&D Organization CESAT, Islamabad* — Islamabad, Pakistan

## Courses

**Applied Kalman Filtering (Specialization)** 12/2024

- *University of Colorado System through Coursera*

87 Classroom Hours (Non-Credit Specialization with 4 Courses)

- Course 01: Kalman Filter Boot Camp (and State Estimation)
- Course 02: Linear Kalman Filter Deep Dive (and Target Tracking)
- Course 03: Nonlinear Kalman Filters (and Parameters Estimation)
- Course 04: Particle Filters (and Navigation)

**Fundamentals of Flight Mechanics (Specialization)** 09/2024

- *ISAE-SUPAERO through Coursera*

25 Classroom Hours (Non-Credit Specialization with 4 Courses)

- Course 01: Flight Mechanics - The Basis
- Course 02: Flight Mechanics – Anemobarometry
- Course 03: Flight Mechanics - Lift and Trajectory
- Course 04: Flight Mechanics - Propulsive Balance & Energy

**MATLAB Programming for Engineers and Scientists (Specialization)** 09/2024

- *Vanderbilt University through Coursera*

113 Classroom Hours (Non-Credit Specialization with 3 Courses)

- Course 01: Introduction to Programming with MATLAB
- Course 02: Mastering Programming with MATLAB
- Course 03: Introduction to Data, Signal and Image Analysis

**Introduction to Artificial Intelligence (AI)** 11/2021

*IBM course through Coursera*

13 Classroom Hours (Non-Credit)

**AI Enabling with Predictive Analytics Inference Workshop for Industry Applications** 10/2025

5 Days Course by AITech NCP

**MATLAB Fundamentals** 10/2025

*MathWorks Training Services*

- MATLAB Onramp
- SIMULINK Onramp

## Projects

**INS/GNSS integrated Algorithm using Linearized and Extended Kalman Filters**

Designed & developed a loosely coupled INS/GNSS integration algorith with 15-states EKF

**Attitude and Heading Reference System (AHRS) aided by magnetometers**

Design and development of AHRS using 9-DOF MPU-9250 IMU with optimal gains in C/C++

**Oscilating/Moving base transfer alignment scheme for Strapdown Navigation Systems**

Developed and tested oscilated/moving base transfer alignment scheme over real time data.

**GNSS Outliers Rejection Strategy for relaiable Integrated Navigation**

Designed & developed GNSS outliers rejection scheme based on comparison of differential changes of INS/GNSS and state covariances

**Computatoin of GNSS receiver position using Satellites pseudo ranges and ephemeris data**

Developed an algorithm to estimate the GNSS receiver postion using simulated Satellites pseudo ranges and ephemeris data.

**3rd Order Vertical Channel damping loop algorithm for integration of INS/ADS/RA.**

Developed a vertical channel damping loop for INS integration with ADS to provide smooth and reliable altitude.

## Awards

**Gold Medal** — 2013
*Pakistan Institute of Enginering & Applied Sciences* — Islamabad
*For securing 1st Postion in batch of M.Phil Physics (2011-2013)* — Pakistan

**Certificate of Apperciation** — 2013
*Pakistan Institute of Enginering & Applied Sciences* — Islamabad
*For outstanding performance in Thesis Project* — Pakistan

**Certificate of Merit** — 2013
*Pakistan Institute of Enginering & Applied Sciences* — Islamabad
*For maintaining CGPA higher than 3.75* — Pakistan

**Merit Scholarship** — 2011
*NESCOM Scholarship for 2 years M.Phil Physics at PIEAS* — Islamabad
Pakistan

## Skills

**Softwares** (MATLAB / SIMULINK, Mathematica, Lab Windows/CVI, LabView, MS Office)
**Programming Languages** (MATLAB, C/C++ (Microsoft Visual Studio),Python,Latex)

## Languages

**English, Urdu, Punjabi**

## Interests

- Sports: Cricket (Amateur), Badminton (Amateur), Table Tennis (Beginner)
- E-Gaming: IGI, Need4Speed

## Recommendations

Name: **Dr. Shakeel Ur Rehman | |** Professor
Pakistan Institute of Engineering and Applied Sciences (PIEAS), Islamabad.
**E-mail:** shakeel@pieas.edu.pk

Name: **Dr. Aman Ur Rehman | |** Professor
Pakistan Institute of Engineering and Applied Sciences (PIEAS), Islamabad.
**E-mail:** aman@pieas.edu.pk

Name: **Dr. Shahid Baig | |** Senior Researcher
Center of Excellence in Science and Technology (CESAT), Islamabad.
**E-mail:** sbaig72@yahoo.com

Portfolio | WeChat | Mail-Me | My-GitHub | My-LinkedIn