YOGANG SINGH

PhD

CONTACT INFORMATION

Lecturer (Assistant Professor Grade)- Automation, Control and Systems Engineering,
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RESEARCH INTEREST

Autonomous & Connected Systems, Marine Robotics, Autonomous Marine Systems, Autonomous Shipping

TEACHING INTEREST

Robotics and Autonomous Systems, Control System Engineering & Mechatronics

EDUCATION

Lecturer (Assistant Professor) **Subject Area: Automation, Control and Systems Engineering** **Department of Engineering and Mathematics** **Sheffield Hallam University**, Sheffield	2023- Present United Kingdom
Post Graduate Certification in Teaching- Fellow **UK Higher Education Academy (HEA)** **Sheffield Hallam University**, Sheffield	2024 United Kingdom
Post Doctoral Research Expert **FlandersMake@UGent- Industrial Systems Engineering (ISyE) Research Group** **Ghent University**, Kortrijk	2020- 2022 Belgium
Post Doctoral Researcher **Intelligent Mobile Platform (IMP) Research Group** **KU Leuven**, Leuven	2020 Belgium
Post Doctoral Researcher **Smart Machine and Assistive Robotics Technology (SMART) Lab** **Purdue University**, West Lafayette	2019 USA
Ph.D. (Mechanical Engineering) *Thesis Title: Cooperative Swarm Optimization of Unmanned Surface Vehicles* **Autonomous Marine Systems (AMS) Research Group** **University of Plymouth**, Plymouth	2015- 2019 United Kingdom
Post Graduate Certification in Teaching- Associate Fellow **UK Higher Education Academy (HEA)** **University of Plymouth**, Plymouth	2017 United Kingdom
M.S. (By Research)- Ocean Engineering *Thesis Title: Design and Development of an Laboratory Underwater Glider* **Indian Institute of Technology-Madras**, Chennai	2012- 2015 India

B.Tech (Mechanical Engineering)   2006 - 2010
SRM University, Chennai   India

SKILLS

Programming Tools: C++ (Advance), MATLAB (Advance), LabView (Advance), Visual Studio (Advance), MELFA-Basic (Basic), Visual Component4.0 (Basic), ROS and MOOS (Middleware-System Design)

Application Tools: SOLIDWORKS, CATIA, AutoCAD, Autodesk Inventor (CAD Modelling- Advance), SHIPFLOW (CFD Tool- Advance), XMPro (Digital Twin Design)

PROFESSIONAL EXPERIENCE

Lecturer (Assistant Professor)— Sheffield Hallam University   Sheffield, United Kingdom
Funding Agency: Sheffield Hallam University   *2023-Present*

- To teach and support students by taking a learner-centred approach in line with the University's learning, teaching and assessment strategy.

- To contribute to curriculum development and delivery, research and other forms of scholarly activity as part of a multi-disciplinary team.

Post Doctoral Research Expert — Ghent University   Kortrijk, Belgium
Funding Agency: FlandersMake and Ghent University   *2020 - 2022*

- Lead Research Track Leader for the research track of Self Configuring Industrial Automation.

- To maintain and document a research road map for the next 10 years together with the involved professors for industrial needs on Industry4.0/5.0 Framework.

- To write new funding proposals in close collaboration with the involved professors and industry partners, as well in Belgium (FWO, VLAIO, FlandersMake) as on the federal level or internationally (Made in Europe).

Post Doctoral Researcher — KU Leuven   Leuven, Belgium
Funding Agency: Agency for Innovation & Entrepreneurship (VLAIO)   *2020*

- Lead researcher for the ICON (Interdisciplinary Cooperative Research) project **Shared Situational Awareness of Vessels (SSAVe)** funded under Blue Cluster. (Project Website).

- Free running trials to conduct Turning Circle and Zig-Zag test on inland vessel *Cogge* in inland waters of Belgium.

- Experimental approach to determination of manoeuvring characteristics for inland vessels.

- Co-researcher in developing navigational aid for remotely operated inland vessel *Cogge* for complete autonomous operation considering the quay approach, docking and mooring procedure.

Post Doctoral Researcher — Purdue University   West Lafayette, USA
Funding Agency: Purdue- NEXUS Consortium   *2019*

- Lead researcher for the NEXUS project **Robotic Water Quality Monitoring and Distribution Systems** (Project Website).

- Design and development of an autonomous sediment sampler for riverbed sampling.

- Design of a smart irrigation framework based on Internet of Things (IoT) for Peruvian highlands.

Doctoral Researcher — University of Plymouth   Plymouth, United Kingdom
Funding Agency: Department for International Development (DFID)   *2015 - 2018*

- PhD researcher working on the concept of multi-robot systems and intelligent path planning in marine domain.

- Organiser for research group meetings and website management.

- Representing research group in conferences, research expos, technical and academic events.

Project Associate — Motilal Nehru National Institute of Technology   Allahabad, India
Funding Agency: Aeronautical Engineering Research Board (AERB)   *2011 - 2012*

- Project staff working on the concept of manufacturing using Electro Discharge Diamond Grinding (EDDG).

- Design and development of test bed for EDDG for micro and nano manufacturing.

- Project report writing and inventory management.

Project Associate — Indian Institute of Technology   Kanpur, India
Funding Agency: Naval Research Board (NRB)   *2010 - 2011*

- Project staff working on the concept of synthetic jets for propulsion of underwater vehicles.

- Design and development of set up for flow measurements and visualisations using hot film and laser Doppler velocimeter.

- Project report writing and inventory management.

HONORS AND AWARDS

- **IEEE OCEANS Student Poster Travel Grant** for co-authoring a top 20 abstract in the world with a Ph.D. student, presented in IEEE OCEANS Seattle 2019.   2019
- **People's Choice Award** in the 6th Agricultural and Biological Engineering Symposium (ABE Symposium), Purdue University for poster presentation with a cash prize of 75$.   2019
- **Visiting Researcher Award** to visit the National Institute of Technology- Rourkela, India funded by **The Royal Academy of Engineering (RAE) Newton Research Collaboration Award**.   2016
- **Doctoral Training Centre Award** under University of Plymouth of £200 towards attending conference "International Conference on Advances in Subsea Engineering, Structures and Systems (ASESS 2016)".   2016
- **Commonwealth Scholarship** under Commonwealth Scholarship and Fellowship Plan (CSFP) tenable in the United Kingdom at University of Plymouth to pursue doctoral studies.   2015
- **Best Student Poster Award** in IEEE/OES International Symposium in Underwater Technology (UT-15).   2015
- **IIT Madras International Travel Grant and Alumni Grant** to present a technical paper in IEEE OCEANS St. John's in Canada.   2014
- **MHRD (Ministry of Human Resource Development), Government of India Scholarship** for pursuing Masters at IIT Madras.   2012
- **SRM Merit Scholarship** for securing first rank in Department of Mechanical Engineering.   2008, 2009
- **Certificate of Merit for Academic Excellence** in Department of Mechanical Engineering, SRM University.   2006.

TEACHING

Industrial Automation — Sheffield Hallam University   Sheffield, United Kingdom
Module Leader, Lecturer and Instructor- Contract Hours: 32   *Jan. 2024 - Present*
- Fundamental knowledge of Supervisory Control and Data Acquisition (SCADA) Software; Interfacing with PLC; Simulation of PLC application in SCADA.
- Fundamental knowledge of Manufacturing systems, cellular manufacturing and conveyor systems.
- Fundamental knowledge of Fault detection and diagnosis of industrial automation systems.
- Basic understanding of ladder logic and programming of PLCs.
- **Target Students**: Level 7 - MSc Automation, Control and Robotics (Class Size: 100).

Mechatronics and Automated Systems — Sheffield Hallam University   Sheffield, United Kingdom
Module Leader, Lecturer and Instructor- Contract Hours: 116   *Sep. 2023 - Present*
- Design and develop mechatronic systems which include the control and integration of electro-mechanical systems.
- Principles of mechatronics in defining and resolving problems in electro-mechanical, robotics, automation, and advanced manufacturing systems
- Assessment of students performance based on submitted mechatronics design coursework and individual report
- Formative and Summative Feedback provided in the written form of (i) marked submissions and (ii) a synoptic digest of responses published over the module BlackBoard site.
- **Target Students**: Level 5 - BEng Mechanical Engineering with Foundation Year (Class Size: 86).

Control of Linear Systems — Sheffield Hallam University   Sheffield, United Kingdom
Module Leader, Lecturer and Instructor- Contract Hours: 116   *Sep. 2023 - Present*
- Modelling, analysing and designing of linear control systems in time and frequency domains as well as digital systems.
- Assessment of students performance based on submitted coursework, simulations and final exam.
- Formative and Summative Feedback provided in the written form of (i) marked submissions and (ii) a synoptic digest of responses published over the module BlackBoard site.
- **Target Students**: Level 7 - MSc Automation, Control and Robotics Students (Class Size: 100).

Advanced Control Methods — Sheffield Hallam University   Sheffield, United Kingdom
Module Co-lead, Lecturer and Instructor- Contract Hours: 48   *Jan. 2023 - May 2023; Jan 2024- Present*
- Design optimal controllers and self-tuning or adaptive controllers for plants with uncertain or changing dynamics (Nonlinear systems – characteristics and causes of nonlinearity. Linearisation of single-input-singleoutput and multivariable systems, stability analysis techniques such as describing function approach).

- Implement advanced optimisation techniques for solving various (e.g. non-convex) optimisation problems.(Advanced optimisation methods - dynamic programming and genetic algorithms)
- Evaluated students performance based on final exams contributing 60% of the overall assesement weightage.
- **Target Students**: Level 7 - MSc Automation, Control and Robotics Students (Class Size: 80).

Control and Instrumentation for Aerospace — Sheffield Hallam University Sheffield, United Kingdom
Module Co-lead, Lecturer and Instructor- Contract Hours: 14 *Jan. 2023 - May 2023*
- Taught Mathematical Modelling and Analysis of Electromechanical Systems typically used in aircraft control systems, using simulation tools MATLAB and SIMULINK.
- Analysis of SISO systems and feedback control, with a view to improving performance.
- Feedback provided in the written form of (i) marked submissions and (ii) a synoptic digest of responses published over the module BlackBoard site.
- **Target Students**: Level 5 - BSc Aerospace Students (Class Size: 20).

Advanced Railway Electrical Engineering — Sheffield Hallam University Sheffield, United Kingdom
Module Co-lead, Lecturer and Instructor- Contract Hours: 12 *Jan. 2023 - May 2023*
- Introduction to Modelling by Experiments and PID Control.
- Lab Experiments with Water Level Management in Water Tanks using concepts from Modelling by Experiments and PID Control
- Exam based student assessment contributing 20% of the overall assessment weightage
- **Target Students**: (Post Graduate)- Level 6- Work Apprenticeship (Class Size: 18).

Fundamentals of Robotic Manipulators — University of Plymouth Plymouth, United Kingdom
Demonstrator/Lecturer- Contract Hours : 26 *Sep. 2018 - Dec. 2018*
- Taught offline and online programming on Mitsubishi industrial robotic manipulators (Mitsubishi RV-2AJ and RV-2SD).
- Assessed student project proposals for final year dissertation.
- Evaluated students performance based on the driving test of the Mitsubishi robotic manipulators.
- Provided brief introduction about marine robots and their application in the current world through a 2 hours lecture.
- **Target Students**: (Undergraduate and Post Graduate)- MEng (Hons) Robotics and BEng (Hons) Robotics (Class Size > 30).

Robotics and Control Theory — University of Plymouth Plymouth, United Kingdom
Demonstrator- Contract Hours : 32 *Nov. 2017 - Jan. 2018*
- Taught offline and online programming on Mitsubishi industrial robotic manipulators (Mitsubishi RV-2AJ and RV-2SD).
- Developed industrial assembly in 3D simulation software *"Visual Component 4.0"*.
- Evaluated students performance based on submitted simulations towards module.
- **Target Students**: (Post Graduate)- MEng Mechanical Engineering, MEng Mechanical Engineering with Composites, and MEng Marine Technology (Class Size > 30).

Basic Electrical Principles — University of Plymouth Plymouth, United Kingdom
Teaching Assistant- Contract Hours : 20 *Jun. 2017*
- Evaluated students marking with a specified answer key provided by the module leader.
- **Target Students**: (Undergraduate)- BEng Mechanical and Marine (Class Size > 70).

Introduction to Robotics — University of Plymouth Plymouth, United Kingdom
Demonstrator- Contract Hours : 32 *Mar. 2017 - Jun. 2017*
- Taught offline and online programming on Mitsubishi industrial robotic manipulators (Mitsubishi RV-2AJ and RV-2SD).
- Enabled students to perform LEGO bricks pick and place operation using industrial robots and simulation of assembly in 3D simulation software *"Visual Component 4.0"*.
- Evaluated students performance based on submitted simulations.
- **Target Students**: (Undergraduate and Post Graduate)- MEng (Hons) Robotics and BEng (Hons) Robotics (Class Size > 30).

Robotics and Control Theory — University of Plymouth Plymouth, United Kingdom
Demonstrator- Contract Hours : 32 *Nov. 2016 - Jan. 2017*
- Taught offline and online programming on Mitsubishi industrial robotic manipulators (Mitsubishi RV-2AJ and RV-2SD).
- Developed industrial assembly in 3D simulation software *"3D Automate"*.

- Evaluated students performance based on submitted simulations towards module.
- **Target Students**: (Post Graduate)- MEng Mechanical Engineering, MEng Mechanical Engineering with Composites, and MEng Marine Technology (Class Size > 30).

PROJECT PORTFOLIO: RESEARCH, COORDINATION & MANAGEMENT

Running

- **Internal Sheffield Hallam Project (United Kingdom)- Towards Design and Development of an Autonomous Marine Vessel for Shallow Water Applications** . [**Amount**$\approx$ 3000\$].
  (**Role**: PI)   2024-Present

  - Lead coordinator for organising technical and administrative meetings with all stake holders for meeting agreed deadlines.
  - Technical meetings with researchers to design approaches for research questions associated with the project.
  - Dealing with major technical and administrative issues associated with the budget and deadlines of the project to the project leader.
  - Presenting research results in group meetings and writing support in publications, technical reports, and presentations associated with the project.

- **Internal Sheffield Hallam Project (United Kingdom)- Towards design and development of a Marine Robotics Unity Simulator (MARUS) using Artificial Intelligence (AI) tools** . [**Amount**$\approx$ 3000\$].
  (**Role**: Co-PI)   2024-Present

  - Lead coordinator for organising technical and administrative meetings with all stake holders for meeting agreed deadlines.
  - Technical meetings with researchers to design approaches for research questions associated with the project.
  - Dealing with major technical and administrative issues associated with the budget and deadlines of the project to the project leader.
  - Presenting research results in group meetings and writing support in publications, technical reports, and presentations associated with the project.

Completed

- **National Project (Belgium)- ICON POSH: Predictive Optimised Supply Chains** for a VLAIO-ICON (VLAIO Cluster) project in collaboration with research partners from Flanders *(VIL and IMEC-ID Lab)* and industrial partners *(Boltzman, Faktion, GIS and Solvice).* [**Amount**$\approx$ 2 M\$].
  (**Role**: Research Coordinator from FM@UGent ISyE Side.)   2020-2021

  - Lead coordinator for organising technical and administrative meetings with all stake holders for meeting agreed deadlines.
  - Technical meetings with PhD researchers and research engineers to design approaches for research questions associated with the project.
  - Escalate major technical and administrative issues associated with the budget and deadlines of the project to the project leader.
  - Presenting research results in group meetings and writing support in publications, technical reports, and presentations associated with the project.

- **National Project (Belgium)- SBO Assembly Recon: Decision Framework for Assembly System Reconfiguration** for a VLAIO-ICON (FM Cluster) project in collaboration with research partners from FM *(ProductionS, ROB-KU Leuven and CoDesignS).* [**Amount**$\approx$ 3 M\$].
  (**Role**: Research Coordinator from FM@UGent ISyE Side)   2020-2021

  - Lead coordinator for organising technical and administrative meetings with all stake holders for meeting agreed deadlines.
  - Technical meetings with PhD researchers and research engineers to design approaches for research questions associated with the project.
  - Escalate major technical and administrative issues associated with the budget and deadlines of the project to the project leader.
  - Presenting research results in group meetings and writing support in publications, technical reports, and presentations associated with the project.

- **National Project (Belgium)- ICON SSAVe: Shared Situational Awareness for Marine Vessels** for a VLAIO-ICON (VLAIO Blue Cluster) project in collaboration with research partners from Flanders *(ROB- KU Leuven, Royal Military Academy and IMEC-ID Lab)* and industrial partners *(Tresco, dotOcean and DEME)*. [**Amount**≈ 2 M$].
  (**Role**: Lead Researcher from ROB-KU Leuven Side.) 2020

  - Performing manoeuvring and captive model test using free running trials on the prototype autonomous inland vessel *Cogge* for inland shipping application available with IMP group.

  - Design and development of AI-based data driven offline system identification method for deriving hydrodynamic derivatives using data obtained from captive model test.

  - Technical meetings with PhD researchers and research engineers to design approaches for research questions associated with the project.

  - Escalate major technical and administrative issues associated with the budget and deadlines of the project to the project leader.

  - Presenting research results in group meetings and writing support in publications, technical reports, and presentations associated with the project.

- **European Project - H2020 EGNSS (European Geo Navigation Satellite Systems) Hull to Hull (H2H)** for a Innovation Action (IA) project in collaboration with industrial partners from Europe *(Konsberg Seatex AS (Norway), SINTEF Ocean AS (Norway), Mampaey Offshore Industries BV (Netherlands), Stiftelsen SINTEF (Norway))* and research partners *(ROB-KU Leuven (Belgium))*. [**Amount**≈ 3 M$].
  (**Role**: Co-Researcher from ROB-KU Leuven Side.) 2020

  - Conducted an experimental study with 32 participants to develop safer and effective navigational aids for autonomous inland shipping that improves the ship handling accuracy of the skippers in Inland Waterways.

  - Technical meetings with PhD researchers and research engineers to design approaches for research questions associated with the project.

  - Escalate major technical and administrative issues associated with the budget and deadlines of the project to the project leader.

  - Presenting research results in group meetings and writing support in publications, technical reports, and presentations associated with the project.

- **National Project (USA)- Purdue-UNSA Robotic Water Quality Monitoring and Distribution Systems** for a UNSA-NEXUS project in collaboration with research partners from Peru *(UNSA)* and USA *(Purdue University)* [**Amount**≈ 365K$].
  (**Role**: Lead Researcher from Purdue University) 2019

  - Design and development of a unmanned surface vehicle with a Van Veen Grab sampler with experimental validation in local water bodies.

  - Design and development of IoT based smart irrigation system for water conservation with experimental validation in Peruvian agricultural fields.

  - Technical meetings with PhD researchers, research assistants and project investigators to design approaches for research questions associated with the project.

  - Escalate major technical and administrative issues associated with the budget and deadlines of the project to the project leader.

  - Presenting research results in group meetings and writing support in publications, technical reports, and presentations associated with the project.

- **National Project (UK)-Cooperative Swarm Optimisation of Unmanned Surface Vehicles** for a Department for International Development (DFID) project in collaboration with *Commonwealth Scholarship Commission, UK* and School of Marine Science and Engineering (*University of Plymouth*). [**Amount**≈ 80K$].
  (**Role**: Lead Researcher and PI from University of Plymouth) 2015-2019

  - Integrated the modules of optimal path planning, robust path following guidance and cooperative swarm aggregation approach towards development of a hybrid framework for the cooperative navigation of a swarm of ASVs to enable optimal and autonomous operation in a practical maritime environment.

  - Organiser for research group meetings and research group website management.

  - Representing research group in conferences, research expos, technical and academic events.

- Escalate major technical and administrative issues associated with the budget and deadlines of the project to the project leader.

- Presenting research results in group meetings and writing support in publications, technical reports, and presentations associated with the project.

- **National Project (India)-Design and Development of a Laboratory Underwater Glider** for a Ministry of Human Resource Development (MHRD) project in collaboration with Department of Ocean Engineering *(Indian Institute of Technology-Madras)* [**Amount**≈ 4K\$].
(**Role**: Lead Researcher and PI from Indian Institute of Technology-Madras) 2012-2015

  - CAD Modelling and CFD study of the underwater glider for hydrodynamic modelling.

  - Prototype manufacturing, testing and validation of the motion performance in indoor (Wave Flume) and outdoor (Swimming Pool) environment.

  - Representing research group in conferences, research expos, technical and academic events.

  - Escalate major technical and administrative issues associated with the budget and deadlines of the project to the project leader.

  - Presenting research results in group meetings and writing support in publications, technical reports, and presentations associated with the project.

  Applied (Not Approved)

- **National Project (Belgium)- ICON Schedule4FMS: Task scheduling for flexible manufacturing systems where human work in close collaboration with autonomous systems** with industrial partners *(Waak, SABCA, Mariasteen, Ometa and Solvice)* for a VLAIO-ICON (FM Cluster) project in collaboration with research partners from FM *(ProductionS and CoDesignS)* [**Amount**≈ 2 M\$].
(**Role**: Co-Project Coordinator from FM@UGent ISyE Side) 2021

  - Writing support in drafting technical and administrative documentation for submission of project proposal to VLAIO i.e. regional funding agency.

  - Lead coordinator for organising technical meetings with all stakeholders for drafting research approach to technical barriers associated with project.

- **EU Project- AISAMAN: AI for Sustainable and Agile Manufacturing (Twin Transition 2021 CL4 Innovation Action Call)** with pan-European industrial partners *(ABB (Finland), Signify (Netherlands), Etxetar (Spain), Vicomtech (Spain), Ikerguine (Spain), Prevision.io (France), ML6 (Belgium) and Syxis (Lithuania))* in collaboration with pan-European research partners *(FM (Belgium), KU Leuven (Belgium), IMT Atlantique (France) and IMT Transfert (France))* [**Amount** ≈ 7.5 M\$].
(**Role**: Co-Researcher and Coordinator from FM@UGent ISyE Side) 2021

  - Writing support in drafting technical and administrative documentation for submission of project proposal to EU Commission.

  - Lead coordinator for organising technical meetings with all stakeholders for drafting research approach to technical barriers associated with project.

SEMINARS, WORKSHOPS, INVITED TALKS AND SCIENTIFIC PROGRAM

- **ICRA 2023 Workshop** - Autonomous Maritime Robotics: Digital Twins with Simulations & Cloud-enabled Massive Datasets held at London ExCel, United Kingdom. (Role: Participant) 2023

- **Invited Research Seminar** on the topic 'Autonomy 4.0: A Control, Automation and Systems Engineering Perspective' to the wider Department of Engineering and Mathematics in the ongoing department research seminar series on 'Control Engineering Advancements and Applications' held at Sheffield Hallam University. (Role: Invited Keynote Speaker) 2023

- **PWI (Permanent Way Institution) -The Institution for Rail Infrastructure Engineering Electrification Seminar** to analyse, understand and discuss industrial interest on **Net Zero Emissions** in UK Railway Electrification Systems funded by industrial partners *Atkins* and *SPL Power Lines* held at Sheffield Hallam University, United Kingdom. (Role: Invited Participant) 2023

- **ABISS 2021- Industrial Fair on Smart, Connected and Digital Industry** to analyse, understand and extract relevant industrial interest in research area of Industry4.0 funded by industrial partners *Actemium* and *Axians* held at Kortrijk, Belgium. (Role: Participant) 2021

- **Industrial [Virtual Mode] Workshop on Robust Modelling and Hybrid Optimisation** in close collaboration with industrial partners *(GIS Europe, Faktion and Solvice)* for a VLAIO-ICON (VIL Cluster) project, Ghent University, Belgium. (Role: Organiser) 2021
- **Invited talk on Intelligent Path Planning, Cooperative Robotics and Multi Robot Systems in Practical Maritime Environment**, IIT Madras, India. (Role: Organiser) 2020
- **Technical Session** in the Purdue-UNSA NEXUS Workshop jointly organised by UNSA and Purdue University, Purdue University, USA. (Role: Organiser) 2019
- **Marine Winter School on Autonomous Unmanned Aerial Systems for Marine and Coastal Monitoring** funded by the European Community's Horizon 2020 Framework programme, Porto, Portugal. (Role: Participant) 2018
- **Marine Technology- Robotics and Artificial Intelligence** workshop organized by European Union Regional Development Fund (EURDF) and ORE Catapult, Cornwall, United Kingdom. (Role: Participant) 2017
- **Ocean Business** Scientific Exhibition and Technology Forum in Ocean Technology organized by National Oceanography Centre (NOC), Southampton, United Kingdom. (Role: Participant) 2017
- **Collaborative Autonomy** workshop organised by South Coast Marine Cluster and QinetiQ, Portsmouth, United Kingdom. (Role: Participant) 2017
- **Development Module Road Map Residential Workshop** organized by Commonwealth Scholarship Commission, Windsor, United Kingdom. (Role: Participant) 2016.
- **International Workshop on Underwater Technologies** jointly organized by National Institute of Ocean Technology (NIOT), IEEE Society and Ministry of Earth Sciences(MoES), Chennai, India. (Role: Participant) 2016
- **Workshop on Submarine and Submersibles** jointly organized by IIT-Kharagpur and Naval Research Board (NRB), Kolkata, India. (Role: Participant) 2013
- **SHIP FLOW Training Programme** organized by Central Marine Fisheries Research Institute (CMFRI), Kochi, India. (Role: Participant) 2013

PROFESSIONAL ACTIVITIES

Student Guidance

- **Role: Second Advisor- PhD Student -Sheffield Hallam University** - Benjamin Maduka Ilo (*Thesis Title: Quality Assessment and Process Optimization of Rice Milling using Artificial Intelligence Technologies*) 2024
- **Role: Thesis Advisor- MSc Students -Sheffield Hallam University** - VS Babu (*Graduated*)- Path Planning for Mobile Robots using Evolutionary Algorithms; NR Janga (*Graduated*)- Trajectory Planning and Control of an Underwater Robot; D Teketi (*Graduated*) - Transmission Stability for generators using PID control; T. Aiyelari (*Graduated, Ongoing as RA*) - Path Following Experiments with Small Autonomous Marine Vehicles; IA Obia (*OGraduated, Ongoing as Visiting Lecturer*) - MPC-based Automatic Flow Control System for Water level in a Water Tank; S Sangar (*Graduated, Ongoing as RA*)- MARUS based PID Control of Marine Autonomous Surface Ships. 2023
- **Role: Co Advisor- Master Students -KU Leuven** - Luk Leemans (*Graduated*) Yentl Michels (*Graduated; Pursuing second masters at KU Leuven, Belgium*)- **Thesis Title: Design, Build and Installation of a Bow Thruster on 1/25 scale model of a Watertruck + Self-Propelling Barge**. 2020
- **Role: Mentoring- PhD Students -Purdue University** - Dr. Tamzidul Mina (*Graduated; Currently working at Sandia NL- USA*), Shyam Sundar Kannan (*Pursuing*), Dr. Jun Han Bae(*Graduated; Currently Assistant Professor at Rochester Institute of Technology, USA*) and Dr. Shaocheng Luo (*Graduated; Currently postdoc at Duke University, USA*). 2019
- **Role: Mentoring- Master and Bachelor Students -Purdue University** - Pou Hei Chan (*Graduated; Currently a PhD student at Texas A& M*) and Yuta Haoshi (*Graduated; Currently a masters student at Carnegie Mellon University, USA*).2019

Academic Administrative Duties

- Academic Advisor for 35 students from Level 7- MSc Automation, Control, and Robotics Course at Sheffield Hallam University. 2023
- Work Experience Mentor for 11 students from Level 7- MSc Automation, Control, and Robotics Course on Industrial Placement at Sheffield Hallam University. 2023
- Second Examiner for MSc Projects. 2023, 2024
- Rapporteur for 1 PhD Student 2023

Leadership Roles

- Organiser: Engineering & Mathematics Research Seminar Series on the theme of **Engineering Innovations: Unveiling the Future** at Sheffield Hallam University. 2023
- Organiser: One [Virtual Mode] Workshop on the topic of **Robust Modelling and Hybrid Optimisation** in close collaboration with industrial partners *(GIS Europe, Faktion and Solvice)* for a VLAIO-ICON project . 2021

- Organiser: Technical sessions on the topic of *Smart irrigation using concept of IoT* in the 2nd **Purdue-UNSA workshop on Sustainable Food, Energy, Water and the Environment**. 2019
- Organiser: Monthly project meetings for the Purdue UNSA NEXUS project on **Robotic Water Quality Monitoring and Distribution Systems**. 2019
- Organiser: Quarterly postdoc webinars for the Purdue UNSA NEXUS project on **Robotic Water Quality Monitoring and Distribution Systems**. 2019

Program Committee
- Technical Committee: **Unmanned Systems Track** in First International Conference of Smart Systems and Emerging Technologies (SMARTTECH 2020). 2020
- Program Committee: **Springer Book on Deep Learning for Unmanned Systems (DLUS)** 2020

Editorial Board
- Editorial Board Member- Area: *Robotics and Automation*; Journal: **Advances in Mechanical Engineering**. 2021

Journal Reviewer (Publons Profile)
- Journal of Oceanic Engineering (Publisher: IEEE). 2021 -
- Machines (Publisher: MDPI). 2021 -
- Journal of Offshore Mechanics and Arctic Engineering (Publisher: ASME). 2021 -
- Journal of Mechanisms and Robotics (Publisher: ASME). 2021 -
- Robotic & Automation Letters (Publisher: IEEE). 2021 -
- Journal of Intelligent & Robotic Systems (Publisher: Springer). 2021 -
- IEEE *Access* (Publisher: IEEE). 2021 -
- Mathematical Problems in Engineering (Publisher: Hindawi). 2021 -
- SN Applied Sciences (Publisher: Springer Nature). 2021 -
- Intelligent Service Robotics (Publisher: Springer Nature). 2021 -
- China Ocean Engineering (Publisher: Springer). 2021 -
- Journal of Field Robotics (Publisher: Wiley). 2020 -
- International Journal of Vehicle Design (Publisher: Inderscience Publishers). 2020 -
- Robotics (Publisher: MDPI). 2020 -
- Remote Sensing (Publisher: MDPI). 2020 -
- IEEE/CAA Journal of Automatica Sinica (Publisher: IEEE). 2020 -
- Applied Ocean Research (Publisher: Elsevier). 2020 -
- Journal of Marine Science and Engineering (Publisher: MDPI). 2019 -
- ISPRS International Journal of Geo-Information (Publisher: MDPI). 2019 -
- Journal of Navigation (Publisher: Cambridge University Press). 2019 -
- Sensors (Publisher: MDPI). 2019 -
- Proceedings of the Institution of Mechanical Engineers, Part M: Journal of Engineering for the Maritime Environment (Publisher: SAGE Publishing). 2019 -
- Energies (Publisher: MDPI). 2019 -
- Applied Sciences (Publisher: MDPI). 2019 -
- Electronics (Publisher: MDPI). 2019 -
- Future Internet (Publisher: MDPI). 2019 -
- Ocean Engineering (Publisher: Elsevier). 2018 -
- International Journal of Advanced Robotic Systems (Publisher: SAGE Publishing). 2018 -
- Journal of Marine Engineering and Technology (Publisher: Taylor and Francis). 2018 -
- Ships and Offshore Structures (Publisher: Taylor and Francis). 2018 -
- Underwater Technology (Publisher: Society for Underwater Technology). 2017 -
- Advances in Mechanical Engineering (Publisher: SAGE Publishing). 2017 -
- Journal of Marine Science and Technology (Publisher: Springer Nature). 2017 -
- Frontiers of Information Technology & Electronic Engineering (Publisher: Springer Nature). 2016 -

Conference Reviewer (Publons Profile)

- European Wave and Tidal Energy Conference (EWTEC 2021).   2021
- International Conference of Smart Systems and Emerging Technologies (SMARTTECH 2020).   2021
- IEEE International Conference on Robotics and Automation (ICRA).   2023, 2021, 2019, 2018
- IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS).   2022, 2020
- IFAC Conference on Control Applications in Marine Systems, Robotics, and Vehicles (CAMS).   2018
- IEEE/UKACC International Conference on Control (CONTROL).   2018
- IFAC International Conference on Climbing and Walking Robots and Support Technologies for Mobile Machines (CLAWAR - 2016).   2016

University Committee & Services
- Vice Chairman: Post Graduate Society, University of Plymouth.   2018
- Secretary: Post Graduate Society, University of Plymouth.   2016 - 2018

PROFESSIONAL MEMBERSHIP

- **Lifetime Member- United Kingdom Higher Education Academy (Fellow).**   2024- Present
- **Lifetime Member- United Kingdom Higher Education Academy (Associate Fellow).**   2017- 2024
- Student Member- RINA (Royal Institute of Naval Architects).   2014 - 2015
- IEEE Graduate Student Member- OES (Ocean Engineering Society) .   2014 - 2015
- Member- MTS (Marine Technology Society).   2014 - 2016

PUBLICATIONS

Journals

1. JA González-Prieto, CP Collazo, and **Y Singh**. Adaptive Integral Sliding mode based Path Following Control of Unmanned Surface Vehicle. *Journal of Marine Science and Engineering*, 10(1):68, 2022

2. T Mina, **Y Singh**, and BC Min. Maneuvering Ability based Weighted Potential Field Framework for Multi-USV Navigation. *Marine Technology Society Journal*, 54(4):40–58, 2020

3. **Y Singh**, M Bibuli, E Zereik, S Sharma, D Hatton, R Sutton, and A Khan. A Novel Double Layered Hybrid Multi-Robot Framework for Guidance and Navigation of Unmanned Surface Vehicles in a Practical Maritime Environment. *Journal of Marine Science and Engineering*, 8(9):624, 2020

4. SG Guevara, **Y Singh**, A Shores, J Mercado, M Postigo, J Garcia, and B Newell. Development of a Pilot Smart Irrigation System for Peruvian Highlands. *Journal of Contemporary Water Research and Education*, 171(1):49–62, 2020

5. P Gerben, SV Baelen, G Yayla, T Catoor, MR Afzal, C Christofakis, R Louw, **Y Singh**, M Vanierschot, R Boonen, and P Slaets. Decoupled Hydrodynamic Models and their Outdoor Identification for an Unmanned Inland Cargo Vessel with Embedded Fully Rotatable Thrusters. *Journal of Marine Science and Engineering*, 8(11):889, 2020

6. **Y Singh**, S Sharma, R Sutton, DC Hatton, and A Khan. A Constrained A* Approach towards Optimal Path Planning for an Unmanned Surface Vehicle in a Maritime Environment containing Dynamic Obstacles and Ocean Currents. *Ocean Engineering*, 169:187–201, 2018

7. **Y Singh**, S Sharma, DC Hatton, and R Sutton. Optimal Path Planning of Unmanned Surface Vehicles. *Indian Journal of Geo Marine Sciences*, 47(07):1325–1334, 2018

8. T Szyrowski, P Bogdan, A Khan, R Pemberton, S Sharma, **Y Singh**, and R Polvara. Range Extension for Electromagnetic Detection of Subsea Power and Telecommunication Cables. *Journal of Marine Engineering '&' Technology*, 0(0):1–8, 2018

9. **Y Singh**, S Sharma, DC Hatton, and R Sutton. Towards use of Dijkstra Algorithm for Optimal Navigation of an Unmanned Surface Vehicle in a Real- Time Marine Environment with results from Artificial Potential Field. *International Journal on Marine Navigation and Safety of Sea Transportation*, 12(1):125–131, 2017

10. **Y Singh**, SK Bhattacharyya, and VG Idichandy. CFD Approach to Modelling, Hydrodynamic Analysis and Motion Characteristics of a Laboratory Underwater Glider with Experimental Results. *Journal of Ocean Engineering and Science*, 2(2):90–119, 2017

Book Chapters (Peer Reviewed)

11. **Y Singh**, S Sharma, DC Hatton, R Sutton, and A Khan. Efficient Optimal Path Planning of Unmanned Surface Vehicles. In Sanjay Sharma and Bidyadhar Subudhi, editors, *Navigation and Control of Autonomous Marine Vehicles*, chapter 2, pages 31–60. IET, Stevenage, 2019

Conference Proceedings (Peer Reviewed)

12. L Van De Ginste, A Van Alboom, **Y Singh**, E Houssaine Aghezzaf, and J Cottyn. A Formal Skill Model Facilitating the Design and Operation of Flexible Assembly Workstations. In *Advances in Production Management Systems (APMS 2021)*, Nantes, France, 2021

13. M Uzunosmanoglu, B Raa, V Limere, A De Cock, **Y Singh**, A Lopez, S Gautama, and J Cottyn. Aggregate Planning for Multi-Product Assembly Lines with Reconfigurable Cells. In *Advances in Production Management Systems (APMS 2021)*, Nantes, France, 2021

14. C Chamani, E Houssaine Aghezzaf, A Khatab, B Raa, **Y Singh**, and J Cottyn. An Integrated Single-Item Lot-Sizing Problem in a Two-Stage Industrial Symbiosis Supply Chain with Stochastic Demands. In *Advances in Production Management Systems (APMS 2021)*, Nantes, France, 2021

15. G Yayla, C Christofakis, S Storms, T Catoor, P Pilozzi, **Y Singh**, G Peeters, MR Afzhal, SV Baelen, D Holm, R Louw, and P Slaets. Measuring the Impact of a Navigation Aid in Unmanned Ship Handling via a Shore Control Center. In *12th International Conference on Applied Human Factors and Ergonomics (AHFE 2021)*, Manhattan, New York, 2021

16. G Yayla, SG Baelen, G Peeters, MR Afzhal, T Catoor, **Y Singh**, and P Slaets. A Case Study for Benchmarking the Accuracy of Galileo and EGNOS in Inland Waterways. In *International Ship Control Systems Symposium (iSCSS 2020)*, TU Delft, Netherlands, 2020

17. A Haseltalab, V Garofano, MR Afzhal, N Faggioni, S Li, J Liu, F Ma, M Martelli, **Y Singh**, P Slaets, X You, and RR Negenborn. The Collaborative Autonomous Shipping Experiment (CASE): Motivations, Theory, Infrastructure, and Experimental Challenges. In *International Ship Control Systems Symposium (iSCSS 2020)*, TU Delft, Netherlands, 2020

18. JH Bae, S Luo, SS Kannan, **Y Singh**, B Lee, RM Voyles, MP Malaga, EG Zenteno, LP Aguilar, and BC Min. Development of an Unmanned Surface Vehicle for Remote Sediment Sampling with a *Van Veen* Grab Sampler. In *2019 MTS/IEEE OCEANS*, Seattle, USA, 2019

19. T Mina, **Y Singh**, and BC Min. A Novel Double Layered Weighted Potential Field Framework for Multi-USV Navigation towards Dynamic Obstacle Avoidance in a Constrained Maritime Environment. In *2019 MTS/IEEE OCEANS*, Seattle, USA, 2019. **(Student Poster Competition)**

20. S Luo, **Y Singh**, JH Bae, E Dietz, X Diao, and BC Min. Image Processing and Model-Based Spill Coverage Path Planning for Unmanned Surface Vehicles. In *2019 MTS/IEEE OCEANS*, Seattle, USA, 2019

21. M Bibuli, **Y Singh**, S Sharma, DC Hatton, R Sutton, and A Khan. A Two Layered Optimal Approach towards Cooperative Motion Planning of unmanned surface vehicles in a constrained maritime environment. In *11th IFAC Conference on Control Applications in Marine Systems, Robotics, and Vehicles (CAMS 2018)*, Opatija, Croatia, 2018

22. **Y Singh**, S Sharma, DC Hatton, R Sutton, and A Khan. Feasibility Study of a Constrained Dijkstra Approach for Optimal Path Planning of an Unmanned Surface Vehicle in a Dynamic Maritime Environment. In *18th IEEE International Conference on Autonomous Robot Systems and Competitions*, Torres Vedras, Portugal, 2018

23. T Szyrowski, P Bogdan, A Khan, R Pemberton, S Sharma, **Y Singh**, and R Polvara. Range Extension for Electromagnetic Detection of Subsea Power and Telecommunication Cables. In *International Conference on Marine Electromagnetics (MARELEC 2017)*, Liverpool, UK, 2017. (**Abstract Only**)

24. **Y Singh**, S Sharma, DC Hatton, and R Sutton. Optimal Path Planning of an Unmanned Surface Vehicle in a Real-Time Marine Environment using Dijkstra Algorithm. In *Proceedings of the Marine Navigation and Safety of Sea Transportation- TransNav 2017*, Gdynia, Poland, 2017

25. **Y Singh**, S Sharma, R Sutton, and D Hatton. Path Planning of an Autonomous Surface Vehicle based on Artificial Potential Fields in a Real Time Marine Environment. In *16th International Conference on Computer and IT Applications in the Maritime Industries (COMPIT 2017)*, Cardiff, UK, 2017

26. W Abed, R Polvara, **Y Singh**, S Sharma, R Sutton, D Hatton, A Manning, and J Wan. Advanced Feature Extraction and Dimensionality Reduction for Unmanned Underwater Vehicle Fault Diagnosis. In *11th IEEE UKACC International Conference on Control (CONTROL 2016)*, Belfast, United Kingdom, 2016

27. **Y Singh**, R Polvara, S Sharma, DC Hatton, R Sutton, and J Wan. Design of a Variable Buoyancy Engine for Small Scale Underwater Vehicle. In *International Conference on Advances in Subsea Engineering, Structures and Systems (ASESS-2016)*, Glasgow, United Kingdom, 2016

28. VK Upadhyay, **Y Singh**, and VG Idichandy. Modelling and Control of an Underwater Laboratory Glider. In *IEEE Underwater Technology (UT)*, Chennai, India, 2015. (**Best Student Poster**)

29. K Palaniappan, **Y Singh**, and VG Idichandy. Numerical Study of a Twin Sphere Pressure Hull and Outer Fairing for Manned Submersible. In *IEEE Underwater Technology (UT)*, Chennai, India, 2015

30. **Y Singh**, SK Bhattacharyya, and VG Idichandy. CFD Approach to Steady State Analysis of an Underwater Glider. In *2014 MTS/IEEE OCEANS*, St Johns, Canada, 2014

Conference Proceedings (Non-Peer Reviewed)

31. **Y Singh**, S Sharma, DC Hatton, and R Sutton. USV Navigation in a Real-Time Map using Intelligent Path Planner. In *International Conference on Mechatronics, Automation and Smart Materials (MECHATRONICS 2017)*, Paris, France, 2017. (**Abstract Only**)

32. **Y Singh**. Steady State Trajectory Simulation of an Underwater Glider. In *IEEE International Workshop on Underwater Technologies*, Chennai, India, 2013. (**Poster**)

33. **Y Singh**. Comparative Study of Tribological, Mechanical and Microstructural Properties of A356 Aluminium Matrix Composites Reinforced with Alumina for Bearing Application. In 3rd *Asian Symposium on Material Processing*, Chennai, India, 2012. (**Poster**)

Dissertations (Peer Reviewed)

34. **Y Singh**. *Cooperative Swarm Optimisation of Unmanned Surface Vehicles*. University of Plymouth, United Kingdom, 2019. (**PhD Thesis**)

35. **Y Singh**. *Design and Development of a Laboratory Underwater Glider*. IIT Madras, Chennai, India, 2016. (**MS Thesis**)

Presentations (Non-Peer Reviewed)

36. **Y Singh**, SG Ocana, J Gracia, B Newell, MP Mauricio, S McMillan, RM Voyles, LLP Aguilar, G Pena, EG Zenteno, and BC Min. *Smart Water Irrigation for Peruvian Highlands: A Pilot Study*. 6th Annual Environmental Community Mixer, Purdue Discovery Park Center for the Environment (C4E), Purdue, USA, 2019

37. **Y Singh**, JH Bae, J Wonse, Y Haoshi, JP Garcia, B Newell, MP Postigo, RM Voyles, LLP Aguilar, G Pena, EG Zenteno, and BC Min. *Design and Development of Unmanned Robotic Water Quality Monitoring and Sediment Sampling Systems*. 6th Annual Environmental Community Mixer, Purdue Discovery Park Center for the Environment (C4E), Purdue, USA, 2019

38. S Luo, **Y Singh**, H Yang, JH Bae, , JE Deitz, X Diao, and BC Min. *Coverage Path Planning for Efficient Spill Cleaning in Maritime Environment*. 6th Annual Environmental Community Mixer, Purdue Discovery Park Center for the Environment (C4E), Purdue, USA, 2019

39. JH Bae, **Y Singh**, J Wonse, Y Haoshi, JP Garcia, B Newell, MP Postigo, RM Voyles, LLP Aguilar, G Pena, EG Zenteno, and BC Min. *Robotic Water Quality Monitoring and Sediment Sampling: A Pilot Study*. Invited Presentation at 2019 NEXUS Workshop Poster Presentation, Purdue, USA, 2019

40. SG Ocana, **Y Singh**, J Gracia, B Newell, MP Mauricio, S McMillan, RM Voyles, LLP Aguilar, G Pena, EG Zenteno, and BC Min. *Development of a Pilot Smart Water Irrigation System for Peruvian Highlands*. Invited Presentation at 2019 NEXUS Workshop Poster Presentation, Purdue, USA, 2019

41. JH Bae, **Y Singh**, MP Malaga, LLP Aguilar, B Lee, RM Voyles, and BC Min. *Design and Development of an Unmanned Underwater Sediment Sampling System*. Invited Presentation at 40th Annual IWRA Spring Symposium, Syracuse, Indiana, USA, 2019

42. SG Ocana, **Y Singh**, J Gracia, B Newell, and BC Min. *Development of a Pilot Smart Water Irrigation System for Peruvian Highland*. Invited Poster Presentation at International Scholar Symposium, Purdue, USA, 2019

43. SG Ocana, **Y Singh**, J Gracia, B Newell, and BC Min. *Development of a Pilot Smart Water Irrigation System for Peruvian Highland*. Invited Poster and Oral Presentation at 6th Agricultural and Biological Engineering Symposium (ABE Symposium), Purdue, USA, 2019. (**People's Choice Award**)

44. SS Kannan, JH Bae, L Sangjun, T Penmetcha, T Mina, W Jo, JH Park, Y Hoashi, YH Wang, **Y Singh**, and BC Min. *Smart Machine and Assistive Robotics Technology (SMART) Laboratory.* Invited Poster Presentation at Purdue Robotics/ IoT Showcase, Purdue, USA, 2019. **(People's Choice Award)**

45. **Y Singh**. *A Two Layered Optimal Approach towards Cooperative Motion Planning of Unmanned Surface Vehicles in a Constrained Maritime Environment.* Invited Presentation at CSC Research Scholar Day (University of Nottingham), Nottingham, UK, 2018

46. **Y Singh** and R Steve. *Collaborative Marine Autonomy.* Invited Presentation at Year of Autonomy Event by QinetiQ (Portsdown Technology Park), Portsmouth, UK, 2017

47. **Y Singh**, S Sharma, DC Hatton, and R Sutton. *Artificial Potential Field for Path Planning of an Uninhabited Surface Vehicle in a Real-Time Marine Environment.* UK Robotics Week, Plymouth University, UK, 2016