

Dr. Yogang SINGH



PERSONAL DATA

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RESEARCH METRIC: [Google Scholar Profile](#) (Scan QR: [ORCID](#))

EDUCATION

NOVEMBER 2015- JANUARY 2019 Awarding Body :	PhD (Mechanical Engineering) University of Plymouth , Plymouth, UK Autonomous Marine Systems (AMS) Research Group Thesis Title: "Cooperative Swarm Optimization of Unmanned Surface Vehicles" Advisors: Dr. Sanjay SHARMA, Prof. Robert SUTTON, Dr. Daniel HATTON and Dr. Asiya KHAN
JUNE 2017	FHEA, Associate Fellow of UK HIGHER EDUCATION ACADEMY (UKHEA) Attained at University of Plymouth, United Kingdom
JULY 2012- OCTOBER 2015 Awarding Body :	Master of Science (By Research) in OCEAN ENGINEERING Indian Institute of Technology- Madras (IIT-M) , Chennai, India Thesis Title: "Design and Development of an Laboratory Under-water Glider" Advisors: Prof. SK BHATTACHARYYA and Prof. VG IDICHANDY CGPA: 10/10
AUGUST 2006- MAY 2010 Awarding Body :	Bachelor of Technology (B.Tech) in MECHANICAL ENGINEERING, SRM University , Chennai, India Final Year Project Title: "Feasibility study of Al 356 alloy based composite for bearing application" CGPA: 9.69/10 (First Class)

WORK EXPERIENCE

JANUARY 2019- PRESENT	POST DOCTORAL RESEARCH ASSOCIATE <i>Purdue University, USA</i> Towards development of an intelligent sediment sampling system for rivers, estuaries and small streams available around agricultural bodies to monitor and quantify environmental pollution and to develop smart water distribution system for irrigation in Peruvian highlands. (Purdue NEXUS Project).
SEPTEMBER 2011- APRIL 2012	PROJECT ASSISTANT <i>Motilal Nehru National Institute of Technology, India</i> Project of Aeronautical Research and Development Board (ARDB), Government of India for development of setup for electro discharge diamond grinding
JULY 2010- MAY 2011	PROJECT ASSOCIATE <i>Indian Institute of Technology, Kanpur, India</i> Project of Naval Research Board (NRB), Government of India towards development of synthetic jet for propulsion and maneuvering of underwater vehicles and project of Department of Science and Technology (DST), Government of India towards development of Micro Holographic Particle Image Velocimetry (PIV) for Bio-Medical and Micro Electro Mechanical System (MEMS) application

SCHOLARSHIPS/ CERTIFICATES/ AWARDS/ GRANTS

2003	CBSE Merit Certificate for being among top 0.1 % succesful candidates from all India in Higher Secondary Hindi Examination
2006	Certificate of Merit for Academic Excellence in Mechanical Engineering Department, SRM University, India
2008 & 2009	SRM Merit Scholarship of (€350 annually) for securing first rank in Mechanical Engineering Department
2012-2015	MHRD (Ministry of Human Resource Development), Government of India Scholarship for pursuing Master of Science (By Research) at IIT Madras amounted to INR 8000/- month for a duration of three years
2014	IIT Madras International Travel Grant and Alumni Grant to present a technical paper in OCEANS 2014 held at St. John's, NL, Canada during 14-19 September,2014.
2015	Best Student Poster Award in IEEE/OES International Symposium in Underwater Technology, UT-15, on February 23-25, 2015 held at National Institute of Ocean Technology (NIOT), Chennai, India.
2015-2018	Commonwealth Scholarship under Commonwealth Scholarship and Fellowship Plan (CSFP) tenable in the United Kingdom at Plymouth University to pursue PhD in School of Engineering (SoE) from year 2015-2018.
2016	SoE Doctoral Training Centre Award under SoE, University of Plymouth of £200 towards attending conference "International Conference on Advances in Subsea Engineering, Structures and Systems (ASESS 2016)" in Glasgow, United Kingdom held on 6-7 June, 2016.
2019	People's Choice Award in the 6 th Agricultural and Biological Engineering Symposium (ABE Symposium) for poster presentation with a cash prize of \$ 75 held on 25 th March, 2019 in Purdue University, USA.

ADMINISTRATIVE ACTIVITIES

University of Plymouth, UK

MARCH 2016 - MARCH 2018
POST GRADUATE SOCIETY
Core Committee Member

Role: *Secretary*

Responsibilities:

Towards organizing networking events for post graduates within the university.

Towards organizing lunch exchanges, tea meetups and day trips to nearby places.

Towards helping prospective and current students with various administrative and bureaucratic issues involved within the university through opendays and meetings.

Target Students:

(Post Graduates)- PGTs, PGRs and PhDs

ADMINISTRATIVE ACTIVITIES (CONTD.)

University of Plymouth, UK

MARCH 2018 - DECEMBER 2018
POST GRADUATE SOCIETY
Core Committee Member

Role: *Vice Chairman*

Responsibilities:

Towards organizing networking events for post graduates within the university.

Towards organizing lunch exchanges, tea meetups and day trips to nearby places.

Towards helping prospective and current students with various administrative and bureaucratic issues involved within the university through open days and meetings.

Target Students:

(Post Graduates)- PGTs, PGRs and PhDs

WORKSHOPS/TRAINING/SCIENTIFIC PROGRAMME

- 2013 Attended **SHIP FLOW Training Programme** jointly organized by CIFT (Central Institute of Fisheries Technology) and Flowtech International AB, Sweden during April 15-18, 2013 held at Kochi, Kerala (India).
- 2013 Attended **Workshop on Submarine and Submersibles** jointly organized by IIT-Kharagpur and Naval Research Board (NRB) during September 13-15, 2013 held at IIT – Kharagpur, Kolkata Campus (India).
- 2013 Attended **International Workshop on Underwater Technologies** jointly organized by NIOT ,IEEE Society and Ministry of Earth Sciences(MoES) on 21st October , 2013 held at NIOT , Chennai (India).
- 2016 Attended **Development Module Road Map Residential Workshop** organized by Commonwealth Scholarship Commission during 17-19 February, 2016 held at Cumberland Lodge, Windsor (United Kingdom).
- 2016 Visited **National Institute of Technology (NIT)-Rourkela, India** as a Visiting Researcher funded by **The Royal Academy of Engineering (RAE) Newton Research Collaboration Award** from 03rd July to 17th July, 2016.
- 2017 Attended **Collaborative Autonomy** workshop organized by South Coast Marine Cluster and QinetiQ at Portsdown Technology Park on 28th February, 2017 at Portsmouth (United Kingdom).
- 2017 Attended **Ocean Business, Scientific Exhibition and Technology Forum** in Ocean Technology organized by National Oceanography Centre (NOC), Southampton during 04-06 April, 2017 held at NOC, Southampton (United Kingdom).
- 2017 Attended **Marine Technology- Robotics and Artificial Intelligence** workshop organized by European Union Regional Development Fund (EURDF) and ORE Catapult in collaboration with Marine-I network on 22 November, 2017 at Tremough Innovation Centre, University of Exeter, Penryn Campus, Cornwall (United Kingdom).
- 2018 Attended **Marine UAS Winter School on Autonomous Unmanned Aerial Systems for Marine and Coastal Monitoring** funded by the European Community's Horizon 2020 Framework programme, under the Marie Skłodowska Curie Innovative Training Network scheme from 15- 26 January, 2018 at Faculty of Engineering of the University of Porto (FEUP), Porto (Portugal).

COMPUTER AND TECHNICAL SKILLS

Basic Knowledge:	SOLIDWORKS, CATIA, AUTOCAD, C++, OPENCV, SHIPFLOW, STARCCM+, ANSYS FLUENT, VISUAL COMPONENT 4.0, 3D AUTOMATE
Intermediate Knowledge:	MATLAB, Microsoft Office, Microsoft Visual Studio, MELFA BASIC-IV, \LaTeX
Operating System :	WINDOWS, UBUNTU (Basic Knowledge)
GitHub Repository :	Code Sample in GitHub
Certifications :	IELTS (The International English Language Testing System) 7.5/10 (Score valid till Feb. 2017)
Role as Reviewer (Publons Profile):	Reviewed papers for following international journals : <i>Ocean Engineering</i> (Publisher: Elsevier) <i>Universal Journal of Engineering Science</i> (Publisher: Horizon Research) <i>Ships and Offshore Structures</i> (Publisher: Taylor and Francis) <i>International Journal of Control</i> (Publisher: Taylor and Francis) <i>Journal of Marine Engineering and Technology</i> (Publisher: Taylor and Francis) <i>Underwater Technology</i> (Publisher: Society for Underwater Technology) <i>Frontiers of Information Technology and Electronic Engineering</i> (Publisher: Taylor and Francis) <i>Advances in Mechanical Engineering</i> (Publisher: SAGE) <i>International Journal of Geo-Information</i> (Publisher: MDPI) <i>Journal of Navigation</i> (Publisher: Cambridge University Press) <i>Sensors</i> (Publisher: MDPI) <i>Journal of Marine Science and Engineering</i> (Publisher: MDPI) <i>Journal of Marine Science and Technology</i> (Publisher: Springer)
Role as Reviewer :	Reviewed papers for following international conferences: <i>CLAWAR 2016</i> <i>IFAC CAMS 2017</i> <i>ICRA 2018</i>

MEMBERSHIP

2014- 2015	Student Member of RINA (Royal Institute of Naval Architects)
DEC. 2014- DEC. 2015	IEEE Graduate Student Member/ Ocean Engineering Society- Member number: 93284734
DEC. 2014- DEC. 2016	MTS (Marine Technology Society)- Member number: 21144

TEACHING ACTIVITIES

University of Plymouth, UK

NOVEMBER 2016- JANUARY 2017
MODULE CODE : MECH 533
Robotics and Control Theory
Contract Hours :32

Role: *Demonstrator*

Responsibilities:

To enable students to perform offline and online programming on Mitsubishi industrial robotic manipulators (Mitsubishi RV-2AJ and RV-2SD).

Development of industrial assembly in 3D simulation software "3D Automate".

Marking and assessing the performance of students based on submitted simulations towards module.

Target Students:

(Post Graduate)- MEng Mechanical Engineering, MEng Mechanical Engineering with Composites, and MEng Marine Technology

JUNE 2017
MODULE CODE : MECH 118
Basic Electrical Principles
Contract Hours :20

Role: *Teaching Assistant*

Responsibilities:

To assess students marking with a specified answer key provided by module leader.

Target Students:

(Undergraduate)- BEng Mechanical and Marine

MARCH 2017- JUNE 2017
MODULE CODE : ROCO 216
Introduction to Robotics
Contract Hours :32

Role: *Demonstrator*

Responsibilities:

To enable students to learn and practice offline and online programming with Mitsubishi industrial robotic manipulators (Mitsubishi RV-2AJ and RV-2SD).

To enable students to perform LEGO bricks pick and place operation using industrial robots and simulation of assembly in 3D simulation software "Visual Component 4.0".

Marking and assessing the performance of students based on submitted simulations towards module.

Target Students:

(Undergraduate and Post Graduate)- MEng (Hons) Robotics and BEng (Hons) Robotics

TEACHING ACTIVITIES (CONTD.)

University of Plymouth, UK

NOVEMBER 2017- JANUARY 2018
MODULE CODE : MECH 533
Robotics and Control Theory
Contract Hours :32

Role: *Demonstrator*

Responsibilities:

To enable students to perform offline and online programming on Mitsubishi industrial robotic manipulators (Mitsubishi RV-2AJ and RV-2SD).

Development of industrial assembly in 3D simulation software "Visual Component 4.0".

Marking and assessing the performance of students based on submitted simulations towards module.

Target Students:

(Post Graduate)- MEng Mechanical Engineering, MEng Mechanical Engineering with Composites, and MEng Marine Technology

SEPTEMBER 2018- DECEMBER 2018
MODULE CODE : ROCO 505
Fundamentals of Robotic Manipulators
Contract Hours :26

Role: *Demonstrator/Lecturer*

Responsibilities:

To enable students to learn and practice offline and online programming with Mitsubishi industrial robotic manipulators (Mitsubishi RV-2AJ and RV-2SD).

To assess project proposals of the student towards their final year dissertation.

Marking and assessing the performance of students based on the driving test of the Mitsubishi robotic manipulators.

Providing a 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

PUBLICATIONS

JOURNALS

- [1] **Y Singh**, SK Bhattacharyya, and VG Idichandy. "CFD approach to modelling, hydrodynamic analysis and motion characteristics of a laboratory underwater glider with experimental results". In: *Journal of Ocean Engineering and Science* 2.2 (2017), pp. 90-119. ISSN: 2468-0133. DOI: [10.1016/j.joes.2017.03.003](https://doi.org/10.1016/j.joes.2017.03.003).
- [2] **Y Singh** et al. "Optimal Path Planning of Unmanned Surface Vehicles". In: *Indian Journal of Geo Marine Sciences* 47.07 (2018), pp. 1325-1334. URL: <http://nopr.niscair.res.in/handle/123456789/44622>.

- [3] **Y Singh** et al. "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". In: *International Journal on Marine Navigation and Safety of Sea Transportation* 12.01 (2017), pp. 125–131. DOI: [10.12716/1001.12.01.14](https://doi.org/10.12716/1001.12.01.14).
- [4] **Y Singh** et al. "A constrained A* approach towards optimal path planning for an unmanned surface vehicle in a maritime environment containing dynamic obstacles and ocean currents". In: *Ocean Engineering* 169 (2018), pp. 187–201. ISSN: 0029-8018. DOI: <https://doi.org/10.1016/j.oceaneng.2018.09.016>.
- [5] T Szyrowski et al. "Range Extension for Electromagnetic Detection of Subsea Power and Telecommunication Cables". In: *Journal of Marine Engineering 'G' Technology (JMET)* (2018). **(Accepted) (Sixth Author)**.
- [6] **Y Singh** et al. "Hybrid Framework for Guidance and Navigation of Multiple Unmanned Surface Vehicles in a Practical Marine Environment". In: *SI-Advanced Control Methods in Marine Robotics Applications* (2019). **(Under Review)**.

CONFERENCES

- [7] **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*. IIT Madras and JSME. 2012, **(Poster)**.
- [8] **Y Singh**. "Steady State Trajectory Simulation of an Underwater Glider". In: *International Workshop on Underwater Technologies*. IEEE and NIOT -India. 2013, **(Poster)**.
- [9] **Y Singh**, SK Bhattacharyya, and VG Idichandy. "CFD approach to steady state analysis of an underwater glider". In: *OCEANS-St. John's*. IEEE. 2014, pp. 1–5. DOI: [10.1109/OCEANS.2014.7002977](https://doi.org/10.1109/OCEANS.2014.7002977).
- [10] K Palaniappan, **Y Singh**, and VG Idichandy. "Numerical study of a twin sphere pressure hull and outer fairing for manned submersible". In: *Underwater Technology (UT)*. IEEE. 2015, pp. 1–11. DOI: [10.1109/UT.2015.7108230](https://doi.org/10.1109/UT.2015.7108230).
- [11] VK Upadhyay, **Y Singh**, and VG Idichandy. "Modelling and control of an underwater laboratory glider". In: *Underwater Technology (UT)*. **(Best Student Poster)**. IEEE. 2015, pp. 1–8. DOI: [10.1109/UT.2015.7108311](https://doi.org/10.1109/UT.2015.7108311).
- [12] **Y Singh** et al. "Design of a variable buoyancy engine for small scale underwater vehicle". In: *International Conference on Advances in Subsea Engineering, Structures and Systems (ASESS-2016)*. (June 6–7, 2016). Glasgow, UK: ASRANET, 2016.
- [13] W Abed et al. "Advanced feature extraction and dimensionality reduction for unmanned underwater vehicle fault diagnosis". In: *Control (CONTROL), 2016 UKACC 11th International Conference on*. **(Third Author)**. IEEE. 2016, pp. 1–6. DOI: [10.1109/CONTROL.2016.7737596](https://doi.org/10.1109/CONTROL.2016.7737596).
- [14] **Y Singh** et al. "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)*. (May 15–17, 2017). Cardiff, UK: DNV-GL, 2017. URL: http://data.hiper-conf.info/compit2017_cardiff.pdf.
- [15] **Y Singh** et al. "Optimal Path Planning of an Unmanned Surface Vehicle in a Real-Time Marine Environment using Dijkstra Algorithm". In: *Marine Navigation and Safety of Sea Transportation*. Proceedings of the TransNav 2017. (June 21–23, 2017). Gdynia, Poland: CRC Press, 2017, pp. 399–402. DOI: [10.1201/9781315099132-70](https://doi.org/10.1201/9781315099132-70).
- [16] T Szyrowski et al. "Range Extension for Electromagnetic Detection of Subsea Power and Telecommunication Cables". In: *International Conference on Marine Electromagnetics (MARELEC 2017)*. (June 27–30, 2017). **(Sixth Author)**. Liverpool, UK, 2017.
- [17] **Y Singh** et al. "USV Navigation in a Real-Time Map using Intelligent Path Planner". In: *International Conference on Mechatronics, Automation and Smart Materials (MECHATRONICS 2017)*. (Nov. 13–14, 2017). Paris, France, 2017. DOI: <https://doi.org/10.4172/2168-9873-C1-014>.

- [18] **Y Singh** et al. “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*. (Apr. 25–27, 2018). Torres Vedras, Portugal, 2018. DOI: [10.1109/ICARSC.2018.8374170](https://doi.org/10.1109/ICARSC.2018.8374170).
- [19] M Bibuli et al. “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*. (Sept. 10–12, 2018). (**Second Author**). Opatija, Croatia, 2018. DOI: <https://doi.org/10.1016/j.ifacol.2018.09.458>.

PRESENTATIONS/DISSERTATIONS AND ABSTRACTS

- [20] **Y Singh** et al. “Artificial Potential Field for Path Planning of an Uninhabited Surface Vehicle in a Real-Time Marine Environment”. In: *UK Robotics Week*. Plymouth University, UK, May 30, 2016.
- [21] **Y Singh** and R Steve. “Collaborative Marine Autonomy”. In: *Invited Presentation at Year of Autonomy Event by QinetiQ (Portsmouth Technology Park)*. Portsmouth, UK, Feb. 28, 2017.
- [22] **Y Singh**. “A Two Layered Optimal Approach towards Cooperative Motion Planning of Unmanned Surface Vehicles in a Constrained Maritime Environment”. In: *Invited Presentation at CSC Research Scholar Day (University of Nottingham)*. Nottingham, UK, Aug. 3, 2018.
- [23] SS Kannan et al. “Smart Machine and Assistive Robotics Technology (SMART) Laboratory”. In: *Invited Poster Presentation at Purdue Robotics/ IoT Showcase*. (**People’s Choice Award**) (**Second Last Author**). Purdue, USA, Feb. 1, 2019.
- [24] SG Ocana et al. “Development of a Pilot Smart Water Irrigation System for Peruvian Highland”. In: *Invited Poster and Oral Presentation at 6th Agricultural and Biological Engineering Symposium (ABE Symposium)*. (**People’s Choice Award**) (**Second Author**). Purdue, USA, Mar. 25, 2019.
- [25] SG Ocana et al. “Development of a Pilot Smart Water Irrigation System for Peruvian Highland”. In: *Invited Poster Presentation at International Scholar Symposium*. (**Second Author**). Purdue, USA, Apr. 17, 2019.
- [26] JH Bae et al. “Design and Development of an Unmanned Underwater Sediment Sampling System”. In: *Invited Presentation at 40th Annual IWRA Spring Symposium*. (**Second Author**). Syracuse, Indiana, USA, June 26, 2019.
- [27] **Y Singh**. “Cooperative Swarm Optimisation of Unmanned Surface Vehicles”. In: (**PhD Thesis**). 2019. URL: <http://hdl.handle.net/10026.1/13700>.

BOOK CHAPTER

- [28] **Y Singh** et al. “Efficient Optimal Path Planning of Unmanned Surface Vehicles”. In: *Navigation and Control of Autonomous Marine Vehicles*. Ed. by Sanjay Sharma and Bidyadhar Subudhi. Stevenage: IET, 2019. Chap. 2, pp. 31–60. DOI: [10.1049/PBTR011E_ch2](https://doi.org/10.1049/PBTR011E_ch2).

REFERENCES

- INDIA - IIT MADRAS
Role: *Master Thesis Supervisor (Main)*
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- INDIA - IIT MADRAS
Role: *Master Thesis Supervisor*
Prof. V.G. Idichandy.
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- INDIA - NIOT CHENNAI
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- USA - PURDUE UNIVERSITY
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