Tamoghna Ojha

Contact Information

Department of Computer Science and Engineering
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C/O Tapan Kanti Ojha
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Research Interests

Internet of Things, 6G Edge Computing, Wirelessly Powered Networks, Sensor-cloud, Resource Management.

Work Experience

Assistant Professor (Grade - I)
Department of Computer Science and Engineering
SRM University-AP, Andhra Pradesh, India
February 2023 - till date

Research Experience

ERCIM Post-Doctoral Research Fellow
Institute for Informatics and Telematics (IIT)
National Research Council (CNR), Italy
October 2021 - July 2022
September 2022 - January 2023

- **Peer-to-Peer Wireless Power Transfer:** Part of team responsible for development of wireless power transfer strategies for the mobile nodes and IoT network.

Research Consultant
Department of Information Engineering
University of Pisa, Italy
October 2022 - January 2023 (3 months)

- Development of algorithms and optimization techniques for efficient management of energy resources through Wireless Power Transfer technologies in mobile computer networks.

Post-Doctoral Research Fellow
Institute for Informatics and Telematics (IIT)
National Research Council (CNR), Italy
January 2021 - September 2021

- **Peer-to-Peer Wireless Power Transfer:** Part of team responsible for development of wireless power transfer strategies for the mobile nodes and IoT network.

Senior Research Fellow
Sponsored Research and Industrial Consultancy
Indian Institute of Technology Kharagpur
November 2013 - July 2017

- **Measurement to Management (M2M): Improved Water Use Efficiency and Agricultural Productivity through Experimental Sensor Network:** Part of team responsible for deployment and data acquisition using sensor networks in the target locations, and development of real-time decision making systems for improved water use in agricultural field.

Junior Project Assistant
Sponsored Research and Industrial Consultancy
Indian Institute of Technology Kharagpur
November 2010 - March 2013

- **Towards Robust Efficient and Secure Data Acquisition in Underwater Sensor Networks (UWSN):** Part of team developing two simulators (NS-3 and MATLAB-based) for UWSNs, and designing specific protocols for UWSNs.

Teaching Experience

- *Faculty Instructor*:
  - *Spring 2023*: Data Structures (Theory and Lab), SRM University-AP, India. (No. of times taught: 1, for UG)
- *Teaching Assistant*:
  - *Autumn 2018*: Programming and Data Structures (Theory), IIT Kharagpur, India. (No. of times taught: 1, for UG)
  - *Autumn 2016 - Spring 2018*: Programming and Data Structures (Lab), IIT Kharagpur, India. (No. of times taught: 4, for UG)
  - *April 2016*: Short term course on "Underwater Sensor Networks: Theory and Simulations" in NPOL (DRDO), Kochi, India. (No. of times taught: 1, for DRDO Scientists)

Education

Doctor of Philosophy, Computer Science & Engineering, 2021 (Thesis defended: 13-Nov-2020)

Indian Institute of Technology Kharagpur, India

- Thesis Title: *Provisioning Sensors-as-a-Service in Sensor-cloud-based Internet of Things*
- Advisors:
  - Prof. Sudip Misra, FIEEE, FNAE, FNASc, ACM DM
  - Prof. Narendra Singh Raghuwanshi, FNAE, FNAAS

Master of Science by Research, Information Technology, 2014

Indian Institute of Technology Kharagpur, India

- Thesis Title: *Architecture and Localization for Underwater Sensor Networks*
- Advisor: Prof. Sudip Misra, FIEEE, FNAE, FNASc, ACM DM
- CGPA: 9.6

Post Graduate Diploma in Embedded Systems Design, 2009

Center for Development of Advanced Computing, Mohali, India

- Project Topic: *A Real-time application for peripheral controlling and monitoring*
- Advisor: Ms. Sonia Dosanjh
- Marks: 80.50%

B. Tech., Electronics & Communication Engineering, 2008

West Bengal University of Technology, Kolkata

- Institute: Haldia Institute of Technology, Haldia
- Thesis Title: *Microcontroller based Infra-Red Tracking Robot*
- DGPA: 7.89

Higher Secondary , 2004

Vidyasagar Vidyapith, Midnapore, West Bengal, India

- Board: West Bengal Council of Higher Secondary Education
- Marks: 71.60%

Secondary, 2002

Pirakata High School, Pirakata, West Bengal, India

- Board: West Bengal Board of Secondary Education
- Marks: 83.38%

Awards and Scholarships

- **"Alain Bensoussan" Post-Doctoral Research Fellowship** from European Research Consortium for Informatics and Mathematics (ERCIM), October 2021 - July 2022 and September 2022 - January 2023.
- **Post-Doctoral Research Fellowship** from National Research Council (CNR) Italy, January 2021 - September 2021.
- **Research Assistantship** from Indian Institute of Technology Kharagpur, August 2019 - May 2020.
- **Senior Research Fellowship** from MHRD, Govt. of India, August 2017 - July 2019.
- **Richard E Merwin Student Scholarship** from IEEE Computer Society, Dec. 2016. (Award: USD 1,000)
- **Senior Research Fellowship** from ITRA, Govt. of India, November 2013 - July 2017.
- **Winner of GE Edison Challenge 2013** (Dec. 2013), GE John F. Welch Technology Center, Bangalore. (**Award INR 10,00,000.00**)
- **Scholarship** from Foundation for Excellence Inc., USA during 2000-2004.

Research and Travel Grants

- Selected for **Plugin Cycle 2 startup cohort** with a grant of INR 10,00,000 during October 2018–June 2019.
- Received **Biotechnology Ignition Grant** of INR 41,79,000 from DBT, Govt. of India in August 2015–January 2017.
- **Best Conference Travel Grant** support from IIT Kharagpur for presenting my paper at IEEE GLOBECOM 2018 at Abu Dhabi, UAE.
- **International Travel Grant** from DST (SERB), Govt. of India for attending IEEE CloudCom, Singapore, Dec. 2014.
- **Conference Travel Grant** from IEEE CloudCom 2014. (Award: SGD 1,000)

Other Awards

- *IEEE TechSym 2016* (I served as Organizing Chair) was selected for **2017 Darrel Chong student activity award** in *GOLD category.*

Details of PhD Guidance

- *C. Amala* (2023 –): Dept. of ECE, SRM University-AP, India (jointly with Dr. Saswat Kumar Ram).

Details of Start-up

Name: SkinCurate Research Pvt. Ltd.
Role: Co-founder and Director
Associated Duration: 2014–2021
Location: Kharagpur, India
Other Co-founders: Dr. Debdoot Sheet, Dr. Kausik Basak, Dr. Sri Phani Krishna Karri
Grants Received:

- BIRAC, DBT, Govt. of India (BIG grant): 41.79 Lakhs INR (August 2015 - January 2017)
- SINE, IIT Bombay and Intel Inc. (Plugin 2 Startup Cohort): 10.00 Lakhs INR (October 2018 - June 2019)

Employment Generated: 4 (technical), 3 (non-technical)
Awards/Recognitions:

- 2018: 1st Runner-Up, CII Healthcare Innovation Summit
- 2018: Among Top 10 teams, Western Digital Innovation Bootcamp (along with Start-up India)
- 2018: Nominated for Economic Times Start-up Awards
- 2017: Indian Patent Filed
- 2014: Selected for CAMTech Final round

Sponsored Research Projects

Title: Multispectral Optical Imaging and Computing Technologies for Realtime in-situ Functional Characterization and Monitoring of Cutaneous Wound Healing Progression
Sponsoring Agency: BIRAC, DBT, Govt. of India (BIG grant)
Amount: 41.79 Lakhs INR

Duration: August 2015 - January 2017 (18 months)
PI: Debdoot Sheet
Co-PIs: Kausik Basak, **Tamoghna Ojha**, Sri Phani Krishna Karri

Title: Breaking the Barriers of Skin Disease Diagnosis with Computational Imaging and Artificial Intelligence
Sponsoring Agency: SINE, IIT Bombay and Intel Inc. (Plugin 2 Startup Cohort)
Amount: 10.00 Lakhs INR
Duration: October 2018 - June 2019 (9 months)
PI: Debdoot Sheet
Co-PIs: Kausik Basak, **Tamoghna Ojha**, Sri Phani Krishna Karri

Products Developed

"A mobile app-powered portable multi-spectral imaging prototype for skin disease detection", at Indian Institute of Technology Kharagpur and SkinCurate Research Pvt. Ltd., 2013-16.

"Jaltarang: A NS-3 based Underwater Sensor Network Simulator", at Indian Institute of Technology Kharagpur, 2011-13. [URL: https://cse.iitkgp.ac.in/~smisra/swan/tre/doc/Jaltarang.zip]

"MAcoSim: Matlab-based Acoustic Underwater Simulator", at Indian Institute of Technology Kharagpur, 2011-13. [URL: https://cse.iitkgp.ac.in/~smisra/swan/tre/doc/MAcoSim.zip]

Patents

D. Sheet, K. Basak, **T. Ojha**, S. P. K. Karri, "Multispectral Optical Imaging Device and Computational Techniques for Contactless Functional Imaging of Skin", *Indian Patent Published*, Application No. 201731022695, Published: 4 January 2019, Applicant: SkinCurate Research Private Limited, Filed: 28 June 2017.

S. Misra, A. Roy, P. Kar, S. Goswami, **T. Ojha**, "An Adverse Environmental Effect Resistant Seamless Wireless Sensor Network System", *Indian Patent Published*, File No. 425/KOL/2015, Published: 1 December 2017, Applicant: Indian Institute of Technology Kharagpur, Filed: 17 April 2015.

Journal Publications

T. Ojha, T. P. Raptis, M. Conti, A. Passarella, "Balanced Wireless Crowd Charging with Mobility Prediction and Social Awareness", *Computer Networks (Elsevier)*, vol. 211, pages 108989, 2022. [DOI: 10.1016/j.comnet.2022.108989] (Invited Submission) (Impact factor – 5.493)

S. Misra, M. Tiwari, **T. Ojha**, Y. Raj, "PANDA: Preference-based Bandwidth Allocation in Fog-enabled Internet of Underground-Mine Things", *IEEE Systems Journal*, vol. 15, no. 4, pp. 5144 - 5151, 2021. [DOI: 10.1109/JSYST.2021.3086150] (Impact factor – 4.802)

T. Ojha, S. Misra, N. S. Raghuwanshi, "Internet of Things for Agricultural Applications: The State of the Art", *IEEE Internet of Things Journal*, vol. 8, no. 14, pp. 10973 - 10997, 2021. [DOI: 10.1109/JIOT.2021.3051418] (Impact factor – 10.238)

S. Misra, **T. Ojha**, P. Madhusoodhanan, "SecRET: Secure Range-Based Localization with Evidence Theory for Underwater Sensor Networks", *ACM Transactions on Autonomous and Adaptive Systems*, vol. 15, no. 1, pp. 1 - 26, 2021. [DOI: 10.1145/3431390] (Impact factor – 1.913)

T. Ojha, S. Misra, M. S. Obaidat, "SEAL: Self-adaptive AUV-based Localization for Sparsely Deployed Underwater Sensor Networks", *Computer Communications (Elsevier)*, vol. 154, pp. 204 - 215, 2020. [DOI: 10.1016/j.comcom.2020.02.050] (Impact factor – 5.047)

T. Ojha, S. Misra, N. S. Raghuwanshi, H. Poddar, "DVSP: Dynamic Virtual Sensor Provisioning in Sensor-Cloud based Internet of Things", *IEEE Internet of Things Journal*, vol. 6, no. 3, pp. 5265 - 5272, 2019. [DOI: 10.1109/JIOT.2019.28999498] (Impact factor – 10.238)

T. Ojha, S. Misra, N. S. Raghuwanshi, "Sensing-cloud: Leveraging the Benefits for Agricultural Applications", *Computers and Electronics in Agriculture*, vol. 135, pp. 97 - 106, 2017. [DOI: 10.1016/j.compag.2017.01.026] (Impact factor – 6.757)

A. K. Mandal, S. Misra, **T. Ojha**, M. K. Dash, and M. S. Obaidat, "Oceanic Forces and their Impact on the Performance of Mobile Underwater Acoustic Sensor Networks," *International Journal of Communication Systems (Wiley)*, vol. 30, no. 1, pp. e2882, 2017. [DOI: 10.1002/dac.2882] (Impact factor – 1.882)

S. Misra, S. Bera, **T. Ojha**, H. Mouftah, A. Anpalagan, "ENTRUST: Energy Trading Under Uncertainty in Smart Grid Systems", *Computer Networks (Elsevier)*, vol. 110, pp. 232 - 242, 2016. [DOI: 10.1016/j.comnet.2016.09.021] (Impact factor – 5.493)

A. K. Mandal, S. Misra, M. K. Dash, and **T. Ojha**, "Performance Analysis of Distributed Underwater Wireless Acoustic Sensor Networks in the Presence of Internal Solitons," *International Journal of Communication Systems (Wiley)*, vol. 29, no. 13, pp 1940 - 1955, 2016. [DOI: 10.1002/dac.2843] (Impact factor – 1.882)

T. Ojha, S. Misra, N. S. Raghuwanshi, "Wireless Sensor Networks for Agriculture: The State-of-the-Art in Practice and Future Challenges", *Computers and Electronics in Agriculture*, vol. 118, pp. 66 - 84, 2015. (Was listed as the **most cited** and among **most downloaded** papers of this journal during 2016–19.) [DOI: 10.1016/j.compag.2015.08.011] (Impact factor – 6.757)

A. K. Mandal, S. Misra, **T. Ojha**, M. K. Dash, and M. S. Obaidat, "Effects of Wind-induced Near-surface Bubble Plumes on the Performance of Underwater Wireless Acoustic Sensor Networks", *IEEE Sensors Journal*, vol. 16, no. 11, pp. 4092 - 4099, 2015. [DOI: 10.1109/JSEN.2015.2443012] (Impact factor – 4.325)

S. Misra, S. Bera, **T. Ojha**, L. Zhou, "ENTICE: Agent-Based Energy Trading with Incomplete Information in the Smart Grid", *Journal of Network and Computer Applications*, vol. 55, pp. 202 - 212, 2015. [DOI: 10.1016/j.jnca.2015.05.008] (Impact factor – 7.574)

S. Misra, **T. Ojha**, and A. Mondal, "Game-theoretic Topology Control for Opportunistic Localization in Sparse Underwater Sensor Networks," *IEEE Transactions on Mobile Computing*, vol. 14, no. 5, pp. 990 - 1003, 2015. [DOI: 10.1109/TMC.2014.2338293] (Impact factor – 6.075)

S. Misra, S. Bera, and **T. Ojha**, "D2P: Distributed Dynamic Pricing Policy in Smart Grid for PHEVs Management," *IEEE Transactions on Parallel and Distributed Systems*, vol. 26, no. 3, pp. 702 - 712, 2014. [DOI: 10.1109/TPDS.2014.2315195] (Impact factor – 3.757)

T. Ojha, M. Khatua, and S. Misra, "Tic-Tac-Toe-Arch: A Self-organizing Virtual Architecture for Underwater Sensor Networks," *IET Wireless Sensor Systems*, vol. 3, no. 4, pp. 307 - 316 , 2013. [DOI: 10.1049/iet-wss.2012.0139] (Impact factor – 2.51)

Conference Publications

T. Ojha, T. P. Raptis, M. Conti, A. Passarella, "Heterogeneity-aware P2P Wireless Energy Transfer for Balanced Energy Distribution", in *Proceedings of IEEE GLOBECOM*, pp. 4123-4128, Rio de Janeiro, Brazil, 2022.

T. Ojha, T. P. Raptis, M. Conti, A. Passarella, "Wireless Crowd Charging with Battery Aging Mitigation", in *Proceedings of IEEE SmartComp*, pp. 142 - 149, Helsinki, Finland, 2022.

T. Ojha, T. P. Raptis, M. Conti, A. Passarella, "MobiWEB: Mobility-Aware Energy Balancing for P2P Wireless Power Transfer", in *Proceedings of IEEE ISCC*, pp. 1 - 6, Athens, Greece, 2021. (Among **best papers** & Invited for extended version)

T. Ojha, S. Misra, N. S. Raghuwanshi, M. S. Obaidat, "iDVSP: Intelligent Dynamic Virtual Sensor Provisioning in Sensor-Cloud Infrastructure", in *Proceedings of IEEE GLOBECOM*, pp. 1 - 6, Abu Dhabi, UAE, 2018.

S. Bera, **T. Ojha**, S. Misra, M. S. Obaidat, "Cloud-based Optimal Energy Forecasting for Enabling Green Smart Grid Communication", in *Proceedings of IEEE GLOBECOM*, pp. 1 - 6, San Diego, CA, USA, 2015.

T. Ojha, S. Bera, S. Misra and N. S. Raghuwanshi, "Dynamic Duty Scheduling for Green Sensor-Cloud Applications," in *Proceedings of* 6^{th} *IEEE International Conference on Cloud Computing Technologies and Science(CloudCom) Workshops*, pp. 841 - 846, Singapore, Dec. 2014.

T. Ojha and S. Misra, "MobiL: A 3-Dimensional Localization Scheme for Mobile Underwater Sensor Networks," in *Proceedings of* 19^{th} *National Conference on Communications (NCC)*, pp. 1 - 5, New Delhi, India, IEEE, Feb. 2013.

T. Ojha and S. Misra, "HASL: High-Speed AUV-Based Silent Localization for Underwater Sensor Networks," in *Proceedings of the* 9^{th} *International Conference on Heterogeneous Networking for Quality, Reliability, Security and Robustness (QShine)*, LNICST 115, pp. 128 - 140, Greater Noida, India, Springer, Jan. 2013.

Invited Talks

- Dec. 2022: *Keynote Speaker* at ICACIE 2022, Cuttack, India
- June 2023: *Resource Person* at FDP on "Applications of Machine Learning and the Internet of Things in Smart Cities" organized by EICT, NIT Warangal and Techno College of Engineering, Agartala

Professional Affiliations

- IEEE - Senior member (2023–present), Professional member (2021–2023), Graduate student member (2013–2020)
- ACM - Professional member (2021–present), Student member (2013–2020)
- IEEE Communication Society member (2014–present)
- IEEE Computer Society member (2014–2021)

Volunteering Experience

- Faculty Coordinator, AI-ML Club, SRM University-AP, India (2023–present)
- Student Representative, IEEE Computer Society India Council SAC (2017)
- IEEE UPP Liaison, IEEE Student Branch, IIT Kharagpur (2016–2017)
- Chair of Executive Committee, IEEE Student Branch, IIT Kharagpur (2015–2016)
- Member, Conference/Workshop Committee, IEEE Computer Society India Council (2015–2016)
- Member, Student Activity Committee, IEEE Student Branch, IIT Kharagpur (2014–2015)
- Graduate Student Volunteer, IEEE Student Branch IIT Kharagpur (2013–2014)

Referee Service

- *Conference Organizing Committee member*:
  - *Publicity Co-Chair*, IEEE DCOSS 2022, California, USA
  - *General Chair*, WPSN 2021 (in conjunction with IEEE DCOSS), Pafos, Cyprus
  - *Publicity Co-Chair*, IEEE DCOSS 2021, Pafos, Cyprus
  - *Organizing Chair*, IEEE TechSym 2016, IIT Kharagpur, India
  - *Organizing Committee member*, IEEE TechSym 2014, IIT Kharagpur, India
- *Technical Program Committee member* (last 5 years):
  - *IEEE ISCC*: 2023 (Tunisia); 2022 (Rhodes Island, Greece); 2021 (Athens, Greece);
  - *IEEE PIMRC*: 2023 (Toronto, Canada); 2022 (Virtual Conference); 2021 (Helsinki, Finland); 2020 (London, UK); 2019 (Istanbul, Turkey); 2018 (Bologna, Italy)
  - *COMSYS*: 2022 (Ropar, India); 2021 (Shillong, India)
  - *SPIN*: 2022, Noida, India
  - *IEEE ATC*: 2019 (Hanoi, Vietnam); 2018 (Ho Chi Minh City, Vietnam)
  - *ACM FICN*: 2018 (in conjunction with ACM MobiCom), New Delhi, India
- *Conference Session Chair*:
  - IEEE ISCC 2021, Athens, Greece
  - IEEE DCOSS 2021, Pafos, Cyprus
- *Journal reviewer*:
  - IEEE Transactions on Sustainable Computing
  - IEEE Transactions on Mobile Computing
  - IEEE Transactions on Vehicular Technology
  - IEEE Internet of Things Journal
  - IEEE Systems Journal
  - IEEE Sensors Journal
  - IEEE Access
  - ACM Transactions on Sensor Networks

  - Ad Hoc Networks (Elsevier)
  - Computer Networks (Elsevier)
  - Pervasive and Mobile Computing (Elsevier)
  - Computers and Electronics in Agriculture (Elsevier)
  - Computer Communication (Elsevier)
  - Telecommunication Systems (Springer)
- *Conference reviewer* (last 5 years):
  - 2023: IEEE ISCC, PIMRC
  - 2022: IEEE ISCC, PIMRC
  - 2021: IEEE CCNC, ICCCS, COVI-COM (IEEE ICC), IEEE DCOSS, IEEE PIMRC, IEEE LCN, IEEE ISCC
  - 2020: IEEE PIMRC, NCC
  - 2019: IEEE PIMRC, IEEE ATC, OPTRONIX
  - 2018: IEEE PIMRC

REFERENCE

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Research Director,
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National Research Council (CNR), Pisa, Italy
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Prof. Narendra Singh Raghuwanshi *(PhD supervisor)*
Director, Maulana Azad National Institute of Technology, Bhopal, India,
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DATED

June 21, 2023