

Dr. VIVEKANANDAN A K

(Associate Professor | Aerospace Materials Specialist | Researcher in Nanotechnology & Ultrasonic-Assisted Manufacturing)

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📖 Google Scholar: <https://scholar.google.com.tw/citations?user=urPd1vwAAAAJ&hl=en>

Professional Summary

Experienced aerospace and materials researcher with a Ph.D. in Mechanical Engineering and postdoctoral expertise in Taiwan. Specializing in material characterization, nanofabrication, and ultrasonic-assisted manufacturing for aerospace applications. Passionate about developing high-performance materials, optimizing energy-efficient systems, and leading innovative research projects in collaboration with global institutions.

Total Experience

◆ **11+ years** in academia and research, with expertise in aerospace materials, nanofabrication, and ultrasonic-assisted manufacturing.

Research Highlights

- 📄 **Citations:** 199
- 📊 **h-index:** 8
- 🏆 **i10-index:** 6
- 📄 **Published Papers:** 11 in Q1 journals, 1 in Q2 journal
- 📝 **Active Reviewer** for Journal of Alloys and Compounds, Sensors and Actuators: B and Electrochemical Acta.

Academic & Research Experience

August 2022-March 2025

Associate professor- *Aeronautical Engineering*

Annasaheb Dange College of Engineering and Technology, Maharashtra, India.

- Teaches aircraft structures, composite materials, and strength of materials
- **Conducts** advanced research **in aerospace materials** and leads funded projects **on corrosion protection.**
- **Published** high-impact journal articles **in Q1 journals.**

March 2022 – July 2022

Postdoctoral Researcher - *Material science*

National Tsing Hua University, Taiwan.

- Analyzed and developed of thermoelectrical materials and devices for the aircraft power system alternators.
- Designed ultrasonic tools for precision cutting and processing of micro components.
- Performed research, testing, data gathering, measurements, and engineering analysis.

- April 2021 – February 2022** **Postdoctoral Researcher** - *Material science*
National Yang Ming Chiao Tung University, Taiwan.
- Fabrication of ZnO, SnO₂ & InSb high aspect ratio single nanowire-based device using Vacuum die casting/FIB techniques to demonstrate the enhanced electronic properties.
- February 2017 - March 2021** **Research Assistant-** *Mechanical engineering*
National Taiwan University of Science and Technology, Taiwan
- Non-linear ultrasonic irradiation behavior: Cavitation effect, ultrasonic intensity, and temperature gradient estimations.
 - Taught mechanical design engineering to undergraduate exchange students.
- July 2015- December 2016** **Assistant professor** - *Aeronautical engineering*
SAMS College of Engg & Tech, India.
- Delivered lectures on strength of materials, composite materials, finite element methods, and thermodynamics.
- July 2013- December 2014** **Assistant professor** - *Aeronautical engineering*
ECET, Coimbatore, India.
- Taught strength of materials, theory of elasticity, theory of vibration, and avionics for undergraduate students.

Area Of Interest:

- Aircraft structures
- Strength of materials
- Composite materials
- Phase transformation
- Mechanical Design Engineering

EDUCATION

Ph.D. 2017 - 2021, National Taiwan University of Science and Technology, Taiwan.

Advisor: Professor Shih-Hsun Chen

Dissertation Title: Acoustical Influence on the Synthesis of Hybrid Transition Metal Oxide Nano-materials for Multifunctional Sensing Applications.

Major: Mechanical Engineering.

M.TECH, 2011 – 2013, Hindustan University, India.

Dissertation Title: FEM-based fatigue analysis on spar lugs of lightweight aircraft.
 Department of Aeronautical Engineering.

B.E., 2006 - 2010, Anna University, India.

Dissertation Title: FEM-based fatigue analysis on spar lugs of lightweight aircraft.
 Department of Aeronautical Engineering.

Technical Skills & Expertise

Materials & Processing: PEO, AAO, CMP, Coating Techniques, Surface Treatment

Material Characterization: SEM, XRD, Raman Spectroscopy, TEM, FTIR

Simulation & Analysis: ANSYS, SolidWorks, MSC Adams, Fatigue & Thermal FEA

Fabrication & Testing: Ultrasonic Tool Design, Precision Machining, Microfabrication

Current Collaborations

- **National Yang Ming Chiao Tung University, Taiwan (2024 - 2026)**
 - ♦ Role: Data Curation and Original Draft Writing.
 - ♦ Leading microstructural analysis and wear characterization of Spark Plasma Sintered $\text{Al}_{0.5}\text{CoCrFeNi}_2$ High-Entropy Superalloy.
- **National Taipei University of Technology, Taiwan. (2024 - 2025)**
 - ♦ Role: Data Curation and Original Draft Writing.
 - ♦ Investigating the effects of heat treatment on Nb_2O_5 -reinforced Mg-3 wt% Al Alloy Matrix Composites.

Industrial & Seed Money Projects

- Designed and developed a Magnetic Foot Hexapod Robot with aluminum joints and 3D-printed foot attachments, implementing tripod gait motion using servo-driven legs for stable locomotion on vertical and inclined surfaces, specifically for chimney inspection in collaboration with **KUB Industries, Pune, India. (2024-2025)**
- Surface engineering of aerospace aluminium alloy for enhanced corrosion protection- Annasaheb Dange College of Engineering and Technology, Maharashtra. (2023-24)

Research & Project Leadership

Post-doctorate researcher, NYMC (March 2021- July 2022)

- **Project Leader:** Designed and developed single nanowire thermoelectric devices using FIB and RIE techniques in collaboration with **Academia Sinica, Taiwan.**
- **Sub-Project Leader:** Developed an integrated hydrogen gas sensing system, collaborating with **NTUT, Taiwan, and King Saudi University, Saudi Arabia.**

2017-2021: Ph.D. program in Mechanical Engineering, NTUST

- Developed and optimized **sonochemical synthesis techniques** to fabricate hybrid transition metal oxide nanomaterials for advanced sensing applications.
- Investigated **ultrasonic-assisted material processing**, focusing on cavitation effects, acoustic stress optimization, and enhanced microstructure properties.

Publications

- SJ Huang, S Kannian, **AK Vivekanandan**, SH Chen, S Srinivasan, “Effect of Nb₂O₅ addition to AZ31 Alloy on the Mechanical Properties and Hydrogen Storage Capability after Heat Treatment.” Journal: Materials Chemistry and Physics. (**Under review-2025**)
1. A Krishnanpandi, N Munusamy, **AK Vivekanandan**, SH Chen, M Sivakumar, SC Kim, (**2025**) “High-performance Electrochemical Sensors Using Sn-Bi₂O₃ nanoparticle on graphene oxide nanocomposite for Selective Detection of Antibiotic in Diverse Environmental Samples.” Journal of the Taiwan Institute of Chemical Engineers. (**Q1, Impact Factor: 5.5**)
 2. B Muthukutty, PS Kumar, **AK Vivekanandan**, M Sivakumar, S Lee, D Lee (**2024**) “Progress and Perspective in harnessing MXene–carbon-based composites (0–3D): Synthesis, performance, and applications.” Chemosphere, 141838 (**Q1, Impact Factor: 8.1**)
 3. **AK Vivekanandan**, C Shao-Fu, L Zhong-You, and C Shih-Hsun (**2023**) “Growth kinetics of crumb-like structure formation on SnO₂ nanowires during direct oxidation”. Heliyon 9 (10). (**Q1, Impact Factor: 3.4**)
 4. **AK Vivekanandan**, CW Lee, and SH Chen (**2022**) “Tailoring InSb nanowires for high thermoelectric performance using AAO template-assisted die-casting process” – Nanomaterials. (**Q1, Impact Factor: 4.7**)
 5. M Sivakumar, BM Kutty, SM Chen, **AK Vivekanandan**, and SH Chen (**2022**) “Electrocatalytic Detection of Noxious Antioxidant in Fruit Samples with Support of Cu@Nanoporous Carbon Modified Sensor” – Chemosphere. (**Q1, Impact Factor: 8.1**)
 6. M Sivakumar, **AK Vivekanandan**, G Panomsuwan, V Veeramani, (**2022**) “Flower-like NiCo₂O₄ nanoflake surface covered on carbon nanolayer for high-performance electro-oxidation of non-enzymatic glucose biosensor” Materials Today Chemistry 26, 101156. (**Q1, Impact Factor: 6.7**)
 7. **AK Vivekanandan**, Kashif Azher, Shao-Fu Chang and Shih-Hsun Chen (**2021**) “Size-controllable Zinc Oxide nanowires fabricated via the combination of die-casting and oxidation process”- Journal of alloys and compounds. (**Q1, Impact Factor: 5.8**)
 8. **AK Vivekanandan**, Bohr-Ran Huang, Adhimoorthy Saravanan, and Shih-Hsun Chen (**2021**) “Effect of MoS₂ solution on reducing the wall thickness of ZnO nanotubes to enhance their hydrogen gas sensing properties” – Journal of alloys and compounds. (**Q1, Impact Factor: 5.8**)
 9. **AK Vivekanandan**, M Sivakumar, SM Chen, and SH Chen (**2021**) “Ultrasonic-assisted synthesis of Nickel tungstate nanoparticles on Poly (3,4-ethylene dioxythiophene): poly (4-styrene sulfonate) for effective electrochemical detection of Caffeic acid” – Material Today Communication. (**Q2, Impact Factor: 3.7**)
 10. Balamurugan Muthukutty, **AK Vivekanandan**, SM Chen, and Shih-Hsun Chen (**2021**) “Novel Construction of Barium Tungstate Unified Oxidised Carbon Black Composite as Electrode Modifier for Low Potential Detection of Antihistamine Drug Promethazine Hydrochloride”- Composite-B. (**Q1, Impact Factor: 12.7**)
 11. **AK Vivekanandan**, Balamurugan Muthukutty, SM Chen, Mani Sivakumar and Shih-Hsun chen (**2020**) “Intermetallic Compound Cu₂Sb Nanoparticle for Effective Electrocatalytic Oxidation of Antibiotic Drug: Sulphadiazine” – ACS sustainable chemistry and engineering. (**Q1, Impact Factor: 7.1**)

12. **AK Vivekanandan**, V Subash, SM Chen and SH Chen **(2020)** “Sonochemical synthesis of nickel-manganous oxide nanocrumbs decorated partially reduced graphene oxide for efficient electrochemical deduction of metronidazole “– ultrasonic Sonochemistry. **(Q1, Impact Factor: 8.7)**

Book Chapters & Conferences

13. AG Patil, **AK Vivekanandan**, AB Hemavathi, **(2023)** “Sustainable wastewater treatment using magnetic nanohybrids”, Nanobiohybrids for Advanced Wastewater Treatment and Energy Recovery, IWP publishing. ISBN: 9781789063585
14. “Design and experimental evaluation of a circular plate for ultrasonic processing of food samples using a langvin transducer” International conference Emerging Technologies in Food Processing- ETFP **2023**, West Bengal, India.
15. “Sonochemical synthesis of NiMnO decorated partially reduced graphene oxide for efficient electrochemical deduction of metronidazole”-ICCS_2020, Kausiayang. Taiwan. –conference
16. “AN SOPC BASED INTELLIGENT BIKE” - International Conference in the name of ICCMS, Sanya **2010**, China and has been published in IEEE Xplore.

Certifications & Additional Skills

- FE-SEM & D2 XRD operation license.
- **Recent Advances in Smart Materials and Sensor Technologies** – AICTE Training and Learning (ATAL) Academy FDP at Hindustan Institute of Technology and Science, January 8-13, 2024.
- **Advancement in Aerospace Materials: Manufacturing, Testing, and Characterization 2.0** – Five-day online FDP organized by Hindustan College of Engineering and Technology in association with the IE Student Chapter, March 11-15, 2024.
- **Recent Advancement in Composite Materials and Structures** – One-week online FDP organised by Department of Aeronautical Engineering, TPCET, Nagpur, May 9-13, 2023.
- **Corrosion Protection Methods** – Successfully completed NPTEL Certification Course.

Achievements

- 🏆 **Young Researcher of the Year (2020)** – Awarded by TTS, Taiwan, for excellence in research and teaching
- 🎓 **Recipient of Full Scholarship** – National Taiwan University of Science and Technology (2017-2021).

Invited Speaker

- “Futuristic thermoelectric materials” 7th International Conference on Science, Engineering, and Technology (ICSET-22) in Nehru Institute of Engineering and Technology, April 2023, Coimbatore, India.
- “Smart materials in thermoelectric energy harvesting” Mahindra international lectures Series, Department of Aeronautical, Mahindra Engineering College. May 2022, Salem, India.
- “Ultrasonic assisted manufacturing process” Department of Mechanical Engineering, Vardhaman College of Engineering, December 2021, Hyderabad, India.