

Abhilash Valisammagari

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Professional summary:

Highly motivated battery researcher with a Ph.D. in Materials Science, specialized in material characterization and mechanical modelling. With more than three years of practical experience in research and development, I am enthusiastic about applying my skills to address complex industrial challenges. Available to work from December 2024.

Work Experience

IFP Energies Nouvelles (IFPEN)

PhD Researcher

Lyon, France

Dec 2021 – Dec 2024

- Investigated the microstructural evolution of Generation 3b silicon anode electrodes using X-ray tomography.
- Conducted in-situ studies of local deformation in silicon electrodes via synchrotron X-ray tomography.
- Developed a Discrete Element Method (DEM) model to analyze and predict mechanical failure in electrodes, specifically delamination.
- Integrated a custom particle swelling model into DEM to simulate electrochemical swelling effects and replicate observed local deformations.
- Implemented a custom developed bonded particle model to study bond failure and delamination in electrodes.
- Collaborated with cross-functional teams to merge experimental and simulation data, leveraging Python for data processing and analysis.

HYCCO

Intern – Process Engineer

Albi, France

Mar – Sept 2020 | Jul – Aug 2019

- Worked on developing thermoplastic composite bipolar plates for hydrogen fuel cells.
- Conducted microscopic failure analysis to identify and categorize defects in composite bipolar plates, contributing to process improvement and quality control.
- Implemented a 2D polymer impregnation model to identify the important parameters impacting the manufacturing process.
- Led the implementation of a data acquisition system, enabling real-time monitoring of manufacturing conditions and process control.

Education

INSA Lyon

PhD in Materials Science and Mechanics

Lyon, France

Graduation date : Dec 2024

IMT Mines Albi / École des mines d'Albi-Carmaux

Master's Degree in Aerospace Material Science, Design & Manufacturing

Albi, France

Graduation date : Oct 2020

IMT Mines-Telecom Business School, (Combined masters)

Master's Degree in Business Management

Evry, France

Graduation date : Oct 2020

Jawaharlal Nehru Technological University,

Bachelor of Technology in Mechanical Engineering

Anantapur, India

Graduation date : Jun 2016

Innovation Projects

SAFRAN Student Challenge

Dec 2019, France

Led a team in optimizing the Turn Around Time (TAT) for the lower deck galleria.

Airbus Fly Your Ideas Challenge

Sept 2018 – Feb 2019, France

Integration of the biometric passport authentication to improve the passenger experience and reduce the waiting time in the airport. The project was selected for the second round in the challenge. Responsible for the preparation of business model and the elevator pitch.

Technical Skills

- ✓ **Battery Technology:** Electrochemical characterization of battery materials, Lithium-ion Battery Systems, Cell Design, assembly, and testing.
- ✓ **Materials Science:** X-ray Tomography, Image analysis, Polymer Processing, Metallurgy, Composite Manufacturing.
- ✓ **Mechanics:** Solid mechanics, Failure Analysis, Finite and discrete Element methods (FEM and DEM), Digital volume correlation (DVC)
- ✓ **Programming and data analysis skills:** MATLAB, C++, Python, Excel, EDEM, Abaqus, Ansys, AutoCAD.
- ✓ **Additional Expertise:** Data Acquisition Systems, Scientific writing, Documentation & Reporting.

Languages

Language	: CERF Level
English	: C2 (Bilingual proficiency)
French	: B2 (Professional working proficiency)
Telugu	: C2 (Native proficiency)

Contact details for reference

Available on request.

Conferences

Valisammagari, A., Maire, E., Esnault, V., Petit, M., « Modelling mechanical failure in li-ion batteries with silicon and graphite composite electrodes using discrete element method ». *International battery association (IBA)*, March 5th -10th, 2023, Austin, Texas, USA.

Valisammagari, A., Maire, E., Esnault, V., Petit, M., « Discrete element model for evaluating local strains in SiOx/C lithium-ion battery electrodes ». *Oxford battery modelling symposium (OBMS)*, 15th and 16th April 2024, Mathematical Institute, Oxford, England.

Publication

Valisammagari, A., Lachambre, J., Adrien, J., Broche, L., Petit, M., Esnault, V., Maire, E., « Study of microstructural evolution and strain analysis in SiOx/C negative electrodes using in-situ x-ray tomography and digital volume correlation », *Batteries and Supercaps*, (Wiley-VCH). Submitted / Under Review.

LinkedIn Profile

<https://www.linkedin.com/in/abhilash-valisammagari-841b28b4/>