

CLARISSA GIUDICI

PhD | Process Modeling, Scale-up & Sustainable Chemical Processes

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PROFESSIONAL PROFILE

Chemical Engineer with a PhD from Politecnico di Milano. specialized in multiscale kinetic modeling, process simulation, and experimental validation for innovative and sustainable chemical processes. Expertise in the design, optimization, and scale-up of hydrocarbon pyrolysis systems for the co-production of high-value carbon materials and turquoise hydrogen. Experienced in both academic and industrial environments, with proven ability to manage research projects, collaborate with multidisciplinary teams, and deliver impactful results in the fields of process engineering, bioeconomy, and circular technologies.

RESEARCH & PROFESSIONAL EXPERIENCE

Research Fellow – Politecnico di Milano, Milan, Italy (Nov 2024 – Present)

- Conducting process modeling and simulation studies for methane pyrolysis in molten metals.
- Developing and validating kinetic models to support pilot plant design and scale-up.
- Coordinating research activities within the CRECK Kinetic Modeling Group, collaborating with industrial and academic partners.

PhD Researcher – Chemical Engineering – Politecnico di Milano (Nov 2021 – May 2025)

- Developed a hierarchical multiscale kinetic modeling framework for floating catalyst CVD reactors producing carbon nanotubes.
- Performed process simulations (Aspen HYSYS, CHEMKIN, OpenSMOKE++) for optimization and scale-up.
- Integrated experimental data from laboratory campaigns to validate predictive models.
- Collaborated with Brembo S.p.A. on process optimization for advanced materials.
- Managed research deliverables, supervised MSc students, and presented results at international conferences.

Visiting Researcher – IMDEA Materials Institute, Madrid, Spain (Nov 2023 – Jul 2024)

- Conducted CNT synthesis experiments in ATEX-certified environments.
- Applied advanced characterization techniques (Raman, SEM, TEM, TGA) to support kinetic model validation.
- Coordinated laboratory work and ensured safety compliance.

TECHNICAL SKILLS

- Process modeling & simulation: Aspen HYSYS, CHEMKIN, OpenSMOKE++, Matlab, Python
- Experimental techniques: Raman spectroscopy, SEM, TEM, TGA, SMPS-DMA
- Process design: PFD, P&ID, scale-up methodology, pilot plant support
- Safety: ATEX environments, risk assessment
- Languages: Italian (native), English (advanced), Spanish (advanced)

EDUCATION

PhD in Chemical Engineering – Politecnico di Milano (Nov 2021 – May 2025)

MSc in Chemical Process Engineering – Politecnico di Milano (Oct 2019 – Oct 2021, 110/110 cum laude)

BSc in Chemical Engineering – Politecnico di Milano (Sep 2016 – Jul 2019, 102/110)

SELECTED PUBLICATIONS

- C. Giudici, G. Contaldo, M. Ferri, L. Pratali Maffei, M. Bracconi, M. Pelucchi, M. Maestri, React. Chem. Eng. 9 (2024) 2505–2519
- C. Giudici, F. Serse, A. Nobili, M. Bracconi, M. Maestri, M. Pelucchi, Academic Press, 2023: pp. 1–62.
- F. Serse, Z. Ding, M. Maestri, A. Nobili, C. Giudici, A. Frassoldati, T. Faravelli, A. Cuoci, M. Pelucchi, Carbon Trends 11 (2023) 100263.

SELECTED CONFERENCES

- 24th International Conference on Science and Application of Nanotubes and Low Dimensional Materials (NT24), Cambridge, MA (USA), June 2024; Oral and Poster presentation.
- 32nd International Conference on Diamond and Carbon Materials, Lisbon, Portugal, September 2022; Oral presentation.

References available upon request

- Licensed Professional Engineer – Industrial Engineering (Section A)