

Jakub Tkaczuk

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Summary

- Seven years of experience in cryogenics, R&D of scientific instruments, mechanical engineering, and physics
- Managed a small research team, coached and supervised fifty students
- Alumnus of two Horizon 2020 programs: Marie Skłodowska-Curie International Training Network EASITrain, and Work Program for Research and Innovation ROXANNE

Experience

ETH Zürich, Senior Researcher

Zürich, CH

Jun 2023 – Now

- Managed biogas sensing project and a team of four research assistants developing biogas flow and composition sensors
- Supervised and coached fifty students during their BSc and MSc theses in mechanical engineering and thermodynamics
- Designed and equipped two mechanical workshops and a biological laboratory
- Successfully applied for funding for biogas technology development in sub-Saharan Africa
- Initiated open source hardware publications, all available on [Github](#)

Idiap Research Institute, Postdoc

Martigny, CH

Jan 2022 – Jan 2023

- Trained and integrated multilingual speech recognition models for a custom-built platform for criminal investigators within the EU-funded ROXANNE project
- Addressed customers needs: developed online speech recognition engines for Spanish telephone providers, took responsibility for solving problems in system integration

National Institute of Standards and Technology (NIST), Visiting Researcher

Boulder, CO, USA

Jan 2019 – May 2019

- Collected and analyzed data for developing the equations of state for cryogenic mixtures
- Assessed the feasibility of developing various types of equations of state for quantum mixtures

CEA Grenoble, Marie Skłodowska-Curie fellow in cryogenics

Grenoble, FR

Mar 2018 – May 2021

- Developed equations of state for cryogenic mixtures of helium, neon, and argon
- Conceptually designed, procured, and assembled equipment for experimental test bench for the Joule-Thomson coefficient measurements
- Experimentally verified mathematical models for the thermophysical properties of fluid mixtures

Technical University of Dresden, Mechanical Engineer

Dresden, DE

Jan 2017 – Feb 2018

- Planned the factory acceptance tests for the Cryogenic Moderator System (CMS) at the European Spallation Source (ESS)
- Refined the existing cryogenic layout of the CMS after Critical Design Review
- Procured and tested components for the hydrogen system of ESS, including key elements, i.e., supercritical hydrogen circulation pumps
- Coordinated cryogenic tests preparation between TU Dresden, Forschungszentrum Jülich, and ESS; participated in engineering studies between the three partners

CEA Grenoble, Cryogenic Engineer

Grenoble, FR

Mar 2015 – May 2016

- Numerically modelled laboratory-scale magnetic refrigeration systems for 1.6 K cooling
- Investigated alternative possibilities for the refrigeration of the RF cavities in FCC-ee

Education

PhD	Université Grenoble Alpes , Applied Physics	Mar 2018 – Dec 2021
	Thesis: Equations of state for the thermodynamic properties of cryogenic mixtures (link)	
MSc	Warsaw University of Technology , Mechanical and Power Engineering	Oct 2012 – Oct 2015
	Thesis: Conceptual design of 1.6 K magnetic refrigerator for the Future Circular Collider (link)	
BSc	Warsaw University of Technology , Mechanical and Power Engineering	Oct 2008 – Jun 2012
	Thesis: Analysis of GE10-1 gas turbine cooling system	

Competences

Engineering	Mechanical and thermal analysis, Object Oriented Programming with Python, SolidWorks
Soft skills	Dedicated team member, effective communicator and adaptable manager; always willing to learn
Languages	Advanced English, advanced French, basic German, native Polish

Publications

Magnetic Refrigeration down to 1.6 K for the Future Circular Collider e+ e- , Journal of Physical and Chemical Reference Data, 10.1103/PhysRevAccelBeams.20.041001	Apr 2017
FCC Physics Opportunities: Future Circular Collider Conceptual Design Report Vol. 1 , European Physical Journal C, 10.1140/epjc/s10052-019-6904-3	Jun 2019
FCC-ee: The Lepton Collider: Future Circular Collider Conceptual Design Report Vol. 2 , European Physical Journal: Special Topics, 10.1140/epjst/e2019-900045-4	Jun 2019
FCC-hh: The Hadron Collider: Future Circular Collider Conceptual Design Report Vol. 3 , European Physical Journal: Special Topics, 10.1140/epjst/e2019-900087-0	Jul 2019
HE-LHC: the High-Energy Large Hadron Collider: Future Circular Collider Conceptual Design Report Vol. 4 , European Physical Journal: Special Topics, 10.1140/epjst/e2019-900088-6	Jul 2019
Equations of State for the Thermodynamic Properties of Binary Mixtures for Helium-4, Neon, and Argon , Journal of Physical and Chemical Reference Data, 10.1063/1.5142275	Jun 2020
Autocrime-open multimodal platform for combating organized crime , Forensic Science International: Digital Investigation, 10.1016/j.fsidi.2025.301937	Sep 2025
Willingness to pay for and economic feasibility of solid waste management in Cape Maclear, Malawi , Resources, Conservation & Recycling Advances, 10.1016/j.rcradv.2025.200281	Aug 2025

Training in Research and Engineering

• Google Project Management Professional Certificate	Feb 2023
• IBM AI Engineering Professional Certificate	Jul 2020
• EASITrain Cryogenic Summer school	Sep 2019
• European Society for Applied Superconductivity summer school	Aug 2018
• European Course of Cryogenics	Aug 2017

Interests

- Running, climbing, alpinism, cycling, skiing
- Thermodynamic modelling, thermal calculations, programming microcontrollers, mechanics and electronics