

Patrick Brandl

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Education

11/2017 – Q1/2021 **PhD Chemical Engineering, Imperial College London, UK**

- Used my problem solving skills and developed a novel techno-economic multi-scale screening tool linking molecular thermodynamics with process engineering for CO₂ capture. My bespoke model is transparent, offers high flexibility at short computational time, and gives accurate results.
- Refuted the general consensus of a 90% capture rate for absorption because 1. it is a historic artefact, 2. not a technical limit, and 3. in no case optimal. Important for net-zero target. Won research prize.
- Quantified the limit of absorption-based CO₂ capture covering 120 years. Showed that solvent R&D is not a silver bullet to drive down cost and identified bottlenecks. Important for exploiting >\$10bn carbon capture market. Submitted to Science.
- Frequent and confident public speaker, led international projects, collaborated with industry, supervised three MSc students, and authored peer-reviewed publications.

10/2014 – 05/2017 **MSc Chemical Process Technology, Technical University of Munich, Germany**

- GPA*: 1.2; Focus on thermodynamics, process engineering, and cryogenics.

04/2016 – 09/2016 **Visiting Researcher, Imperial College London, UK**

- Refuted common assumption that adding CCS to a thermal power plant increases its total cooling requirements. Published results in peer-reviewed journal.

10/2011 – 04/2015 **BSc Chemical Engineering, Technical University of Munich, Germany**

- GPA*: 1.8; Focus on thermo-fluid dynamics, process modelling, and unit operations.

09/2003 – 07/2011 **Abitur, Städtisches Willi-Graf-Gymnasium München, GPA*: 1.6**

Work Experience

11/2017 – present **Consultant, Imperial Consultants (ICON), London, UK**

- Led and successfully delivered a project with major oil and gas companies benchmarking their / proprietary solvent technologies of interest on techno-economic performance while fully protecting IP. Presented findings at an international conference and wrote a book chapter.
- Worked closely and flexibly with clients adjusting to requests and availability of data.

06/2017 – 11/2017 **Research Assistant, Imperial College London, UK**

- Analysed the potential for absorption-based decarbonisation of oils sands processing.
- Accelerated solvent development by implementing group contribution methods into process modelling.
- Collaborated with partners in Abu Dhabi and Canada, and demonstrated active and effective communication giving updates on progress and findings from Imperial.

10/2016 – 05/2017 **Junior Researcher, Group R&D, THE LINDE GROUP, Site Pullach**

- Identified and closed knowledge gaps in air separation plants exemplifying my drive for innovation and critical thinking with two patents. Reduced costs in multiple departments.
- Commended for my innovation, communication, team-work, and social skills.

03/2015 – 04/2015 **Intern, Heat Exchanger R&D, DENSO Automotive Deutschland GmbH, Site Eching**

- Developed surface coatings for evaporators in HVAC applications and flagged down a major problem to Directors. Ran experiments and contributed to new protocols.

10/2014 – 03/2015 **Student Assistant, Institute for Thermodynamics, Technical University of Munich**

- Modelled high-frequency instabilities in gas turbine combustion chambers via CFD.

10/2012 – 02/2014 **Tutor, Department of Chemistry, Technical University of Munich**

- Ran highly-popular thermodynamics sessions for undergraduate students.

07/2010 **Intern, Max Planck Institute for Plasma Physics, Site Garching**

- Observed daily operations and obtained basic knowledge of fusion-oriented plasma physics.

Skills

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| Experimental Laboratory | Designed, planned, conducted and analysed boiling phenomenon experiments in a pre-pilot scale fluid loop setup. |
| Thermodynamics and Process Simulation | gPROMS ModelBuilder and ProcessBuilder, gSAFT, Aspen Plus, OPTISIM, ProTreat, ALAMO, Multiflash, FOQUS, and IECM. |
| Computational Fluid Dynamics | OpenFOAM, ANSYS Fluent and ANSYS ICEM CFD. |
| Electronic Data Processing | TeX, MS-Office (especial in Word, Excel and Power Point), Origin, Inkscape. |
| Operating System | Windows and Linux. |
| Languages | German: native, English: fluent (IELTS 8.0). |

Achievements

- Holding two patents covering the cryogenic separation of air.
- Published 2 peer reviewed articles, 3 conferences articles, and two book chapters.
- Presented at 5 conferences, gave 13 talks (one invited), contributed 12 posters, and chaired 8 sessions.
- President's Medal for Excellence in Research, Centre for Process Systems Engineering, 2018.
- 1st place, Best Poster Award, UKCCSRC conference, Cardiff 2019.
- WACKER summer scholar, WACKER Chemie, Burghausen, 09/2016.
- Certificate for tutoring in higher education, ProLehre, Carl von Linde-Akademie, 07/2014.
- Mini-MBA, Graduate School, Imperial College London, 2018.
- Interned at Siemens in Munich (2008) and interned as mechanic in vintage car workshop (2012).

Professional Memberships

- Early Career Researcher, UK Carbon Capture and Storage Research Centre (UKCCSRC)
- Associate Member, Institution of Chemical Engineers (IChemE)
- Future Energy Leader, Institution of Chemical Engineers (IChemE)
- Student Member, Energy Institute

Social Commitment and Interest

- Leading Rackets Cubed @Imperial, charity for disadvantaged children (2018 – present).
- Represented students on departmental and faculty level in various roles (10/2012 – 09/2019)
- Keen squash player with experience in leading a club as coach and player (01/2012 – present).

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