

Dieter Trau

Professor and Dean at the School of Engineering & Technology (SET)

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Summary

- Ph.D. in chemistry and engineering degree (Dipl Ing. FH) in biotechnology.
- More than 25 years' experience in colloid chemistry/encapsulation, bioassay and biosensors.
- Planned and executed multidisciplinary R&D projects. Prototyped bioanalytical instruments; bioassays and encapsulation platforms.
- Inventor of 17 patent families, resulting in >80 patent applications and ~30 granted patents.
- Authored 53 international peer-reviewed publications with >3200 citations; h-index = 29 (Source: Google Scholar).
- Authored 2 book chapters with Wiley (Multilayer Thin Films) and one chapter with Elsevier (Comprehensive Biomaterials).
- Serial inventor-entrepreneur holding Founder, CEO and CTO positions.
- Negotiated and concluded several investments, employment, exclusive licensing, and various other corporate agreements.
- Founder/inventor of NUS startup company AYOXXA (2011) employing >45 people in Singapore, Germany and USA, received ~28 million EUR venture funding. www.ayoxxa.com
- Founder/inventor of NUS startup company Tip Biosystems Pte Ltd. (2014). Privately funded. Products developed and, manufactures and marketed in Singapore. www.tipbiosystems.com
- Co-Founder of NUS startups Abyss Processing Pte Ltd (2016) offering glaucoma diagnostics software and Avecris Pte Ltd offering cancer/viral treatments. www.abysprocessing.com

Research interest

Development of new approaches and platform technologies for bioanalytics, biosensors and diagnostics. By utilizing synergies within microfabrication, encapsulation technology, surface/colloidal chemistry and molecular biology novel analytical techniques and devices are created. Expert in analytical chemistry, colloidal chemistry and encapsulation. Major inventions are "Reverse Phase LbL Encapsulation Technology" to encapsulate macromolecular drugs; "Microcapsule-PCR" to perform millions of PCRs in parallel; "In-situ Encoded Bead Microarrays" for protein multiplexing; "Supernova biolabel technology" for ultra-high sensitive bioassays; "PHOTOPETTE handheld photometer" technology enabling the first personal photometer and "BiliOptics Sclera Scanner" for non-invasive jaundice diagnostics and management in infants. Patents are granted for most of Dr Trau's technologies and commercialized by several companies including Capsulation GmbH and 8sens Biognostic GmbH in Germany, Supernova Ltd in Hong Kong and AYOXXA Pte Ltd/GmbH and Tip Biosystems Pte Ltd in Germany and Singapore.

Work experience

Professor, 07/2019 – present

Asian Institute of Technology (AIT), Dean of the School of Engineering & Technology (SET)

Founding Director of AIT Entrepreneurship Center

Associate Professor with tenure, 01/2014 – 06/2019

National University of Singapore (NUS), Department of Biomedical Engineering and Department of Chemical & Biomolecular Engineering.

Assistant Professor, 01/2004 – 12/2013

National University of Singapore (NUS), Department of Biomedical Engineering and Department of Chemical & Biomolecular Engineering.

Assistant Lecturer / Visiting Assistant Professor, 04/2002 - 01/2004

Hong Kong University of Science & Technology (HKUST), Department of Chemical Engineering, Bioengineering Graduate Program, Hong Kong SAR.

Research Associate, 4/2001- 03/2002

Hong Kong University of Science & Technology (HKUST), Department of Biochemistry.

R&D Engineer in Medical Diagnostics and Biosensors, 5/1994 - 9/1998

Institute of Chemical- and Biochemical Sensor Research (ICB), Münster, Germany.

Entrepreneur, 9/1997 - present

Serial entrepreneur and cofounder of the biotechnology companies *biognostic* (www.biognostic.de) in Berlin, *XanTec* in Münster, Germany and AYOXXA, Tip Biosystems Pte Ltd, Abyss Processing Pte Ltd and Avecris Pte Ltd in Singapore.

Education Ph.D. in Chemistry, 2001

Department of Chemistry, HKUST in Hong Kong in collaboration with the Max-Planck Institute for Colloids and Interfaces in Berlin, Germany.

Engineering degree (Dipl. Ing. FH) in Chemical Engineering/Biotechnology, 1994

Aachen University of Applied Science, Aachen/Jülich, Germany.

Other

Proficient sailor and boat racer. High level in photography and graphic design. Experienced in all aspects of IP creation, strategy and protection. Strong hardware, electronic and optics skills. Bilingual English/German.

Short biography

Prof Trau holds an engineering degree (Dipl. Ing. FH) from the *Aachen University of Applied Science*, 1994 in Chemical and Bioengineering and a PhD from the *Hong Kong University of Science & Technology (HKUST)* 2001 in Chemistry. He worked as a Research Engineer in Germany from 1994 to 1998 and started his entrepreneurial activities with the foundation of the biotechnology companies *Xantec* (1995), *8sens biognostic* (2000) in Germany, *AYOXXA Pte Ltd* (2010) and *Tip Biosystems Pte Ltd* (2014) in Singapore. He was a Research Fellow, Assistant Lecturer/Assistant Professor at *HKUST* from 2001 to 2004. In 2004 he joined the Division of Bioengineering and the Department of Chemical & Biomolecular Engineering at the *National University of Singapore (NUS)* as an Assistant Professor. He was promoted to Associate Professor with tenure in 2013. Prof. Trau's research interest is in the area of encapsulation technologies, bioanalytics, biosensors and microdevices. In his interdisciplinary work he combines microfabrication, encapsulation technology, surface/colloidal chemistry and molecular biology to develop novel analytical techniques and devices. He is author of >60 international peer reviewed research papers, inventor of 17 patent families with >80 patent applications and >30 granted patents and commercialized by several companies. Dr Trau has extensive knowledge and experience technology startups, IP management including IP search, patent drafting, patent strategy, novelty and inventive step issues and patent licensing, marketing and commercialization.

Awards

- 1st Prize at "Best of Biotech" Competition with AYOXXA, Austria 2010
- Kaufman Foundation Global Top50 Start-Up 2010 with AYOXXA
- "Promising NUS Startup Award" including 100,000 SGD prize money, Singapore, 2013
- 2nd Prize "Asian Entrepreneurship Award", Japan, 2013
- Multiple awards with student projects from the Trau Lab, e.g. EMedIC Global Competition 2018.