

## Curriculum Vitae for Xiaodong Zou

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Born January 4, 1964. Female, married, three children (born in 1989, 1995 and 2000, maternity leave in total 24 months). Swedish citizen. English, Swedish and Chinese fluent.

### A. Professional preparation

Bachelor of Sciences in solid state physics, Peking University, July, 1984.  
Master of Sciences in metal physics, Beijing University of Science and Technology, 1986.  
Doctor of Philosophy in structural chemistry, Stockholm University, 1995.  
Post doc at Institute of Geology, Lund University, 1995 - 1996.

### B. Appointments

August 1 2013 –: Deputy Head of Department of Materials and Environmental Chemistry, SU.  
January 2010 –: Research subject representative of Inorganic Chemistry, Department of Materials and Environmental Chemistry, SU.  
October 2006 – February 2012: Founder and Director of the Berzelii Centre EXSELENT on Porous Materials, SU.  
April 2006 – October 2011: Founder and Director of the Materials Analysis Centre at Arrhenius Laboratory (MACAL), SU.  
March 2005 –: Professor in Structural Chemistry, at the Department of Materials and Environmental Chemistry, Stockholm University.  
Jan. 2001 – December 2005: Research Fellow at the Royal Swedish Academy of Sciences (KVA).  
March – August 1999: visiting professor at Institut des Matériaux Jean Rouxel, Nantes, France.  
January 1997 – December 2000: research assistant (docent May 1998) at the Department of Physical, Inorganic and Structural Chemistry, Stockholm University, supported by NFR.  
January 1987 – December 1987: research assistant at the Beijing Laboratory of Electron Microscopy, Chinese Academy of Sciences, Beijing.

### C. Supervision of Ph.D. students and post-doctoral fellows:

**36 Ph.D. students** (23 as main supervisor and 13 as co-supervisor).

*Graduated as main supervisor (13) with years of thesis defence and current working place:*

Tony Conradsson, 2002. Liqiu Tang, 2005; *Elkem*, Norway; Kirsten E. Christensen, 2008, *University of Oxford*; Daliang Zhang, 2010, *Jilin University*, China; Mikaela Gustafsson, 2012, *Sandvik Coromant*, Sweden; Andrew Kentaro Inge, 2012, *MMK, SU*; Tom Willhammar 2013, *MMK, SU*. Yifeng Yun, 2014, *Synfuels China, Beijing*; Fabian Carson, 2015, *Mycronic AB, Stockholm*; Peng Guo, 2016, *Dalian Institute of Chemical Physics, Chinese Academy of Sciences*; Hani Nasser Abdelhamid, 2017, *Assuit University, Egypt*; Yunchen Wang, 2017, *Sigma Technology, Sweden*; Magdalena O. Cichocka, 2019, *Delft University of Technology, Netherlands*. Taimin Yang, 2019. Ning Yuan, 2019. Bin Wang, 2019.

*Present Ph.D. students as main supervisor (7) with starting years:*

Jung Youn Cho (2019), Meng Ge (2018), Molly Lightowler (2018), Laura Samperisi (2018), Jingjing Zhao (2016), Viktor Bengtsson (2016), Elina Kapaca (2013, parental leave 2x12 months).

Most of them are established as independent researchers in academia (Christensen, Zhang, Inge, Guo, Abdelhamid) or in industry as R&D managers/senior engineers (Tang, Gustafsson, Carson, Yun, B. Wang). Willhammar and Guo received Sigrid Arrhenius stipendium for the best Ph.D. theses in Natural Sciences at SU. A. Ken Inge and T. Willhammar received Anna Sundström

Award for the best PhD thesis in Inorganic Chemistry from the Swedish Chemical Society. Inge received Ingvar Carlsson Award 2017 and Willhammar holds a VR postdoc grant 2016-2018.

#### **41 post-doctoral fellows**

**Former:** Thomas Weirich, 1997-1999. Kai Sun, 1998-2000. Zhimin Mo, 2000. Guo-Yu Yang, 2001. Mauro Gemmi, 2001-2002. Markus Doeblinger, 2002. Yafeng Li, 2002-2004. Lesya Demchenko, 2005. Hong Zhang, 2004-2005. Tie-zhen Ren, 2005-2006. Lei Shi, 2005-2007. Zhanbing He, 2005-2007. Junliang Sun, 2007-2008. Charlotte Bonneau, 2007-2008. Mingrun Li, 2007-2009. Daniel Grüner, 2009. Huijuan Yue, 2007-2010. Lei Han, 2009-2010. Max Peskov, 2008-2011. Suman Sahoo, 2009-2011. Wei Wan, 2009-2011. Qingxia Yao, 2009-2013. Jie Su, 2010-2014. Ana Eva Pletero Prats, 2012-2014. Devinder Singh, 2012-2014. Changhong Xiao, 2013-2014. Ilich Ibarra, 2013-2014. Yi Zhang, 2013-2015. Changjiu Xia, 2014-2015. Haoquan Zheng, 2012-2016. Jiho Shin, 2015-2016. Diana Bernin, 2015. Hongyi Xu, 2014-2017 (he holds his own VR starting grant from 2018); Stef Smeets, 2016-2018. Jonas Ångström, 2016-2018. Karl Gustafson, 2018-2019.

**Current:** Zhehao Huang, 2015-. Max Clabber, 2018-. Maria Roslova, 2018-. Yi Luo, 2019- ; Jian Li, 2019-.

Many of them have established themselves as professors (5) or associated/assistant professors (10) at different universities.

#### **D. Scientific Collaboration**

- Prof. Simon Parsons, University of Edinburgh, UK
- Prof. Jiří Čejka, Charles University, Prague, Czech Republic
- Prof. Avelino Corma, Inst. Tecnología Química, UPV-CSIC, Univ. Politécnica de Valencia, Spain
- Prof. Norbert Stock, Christian-Albrechts-Universität, Kiel, Germany
- Prof. Paolo Falcaro, Graz University of Technology, Austria
- Prof. Lynne McCusker and Dr. Christian Baerlocher, Laboratory of Crystallography, ETH Zurich
- Prof. Zhenan Bao, Stanford University, USA
- Prof. Hong-Cai Zhou, Texas A&M University, USA
- Prof. Jeffrey D. Rimer, University of Houston, USA
- Prof. Sankar Nair, Georgia Institute of Technology, USA
- Prof. Akif Tezcan, University of California, San Diego, USA
- Prof. Bradley F. Chmelka, University of California, Santa Barbara, USA
- Prof. Omar Yaghi, Department of Chemistry, University of California, Berkeley, USA
- Dr. Allen Burton, ExxonMobil Research & Engineering Co., USA
- Drs. Stacey Zones and Dan Xie, Chevron Energy Technology Company, USA
- Prof. Makoto Fujita, University of Tokyo, Japan
- Prof. Martin Högbom, Department of Biophysics and Biochemistry, SU, Sweden
- Dr. Marta Carroni, SciLifeLab and Department of Biophysics and Biochemistry, SU, Sweden
- Profs. Jan-Erling Bäckvall, Belén Martín-Matute, Department of Organic Chemistry, SU, Sweden
- Prof. Sascha Ott, Uppsala University, Sweden
- Prof. Licheng Sun, KTH Royal Institute of Technology, Sweden
- Prof. Ingman Persson, Swedish Agricultural University, Sweden
- Prof. Suk Bong Hong, Department of Chemical Engineering, POSTECH, Pohang, Korea
- Prof. Jihong Yu, Jilin University, China
- Profs. Xuhong Mu and Xingtian Shu, SINOPEC Research Institute of Petroleum Processing, China

**E. Commissions of trust*****National***

Member of the Nobel Committee in Chemistry, 2020-

Elected Member of the Royal Swedish Academy of Sciences (KVA), 2019-.

Elected Member of the Royal Swedish Academy of Engineering Sciences (IVA), 2017-.

Wallenberg Academy Fellow (WAF) Evaluation Committee in Natural Sciences, 2019-.

Member of the Swedish National Committee for Chemistry, 2012-.

Panel Member RFI-BG2 “infrastructure for molecules, cell and materials research”, Research Infrastructures, the Swedish Research Council, 2011-2017.

Panel Member of the Evaluation group in Chemical Engineering (NT-H), VR, 2006, 2008.

***International***

Member of the IUCr OUP Book Series Committee, 2017-.

Fellow of the Royal Chemical Society (FRCS), 2016-.

Council Member of the International Zeolite Association, 2016-.

Member of the Structure Commission of International Zeolite Association, 2010-.

Panel Member (PE5) of the ERC Starting Grant 2015, 2017, 2019.

Project Review Panel Member “Hard Condensed Matter”, DESY Photo Science, 2015-2019.

Member of the SIG (Special Interested Group) on Electron Crystallography, European Crystallographic Association, 2000-.

Editor of *Zeitschrift für Kristallographie*, 2010-2015.

Member of the Commission on Electron Crystallography of the International Union of Crystallography, 2002-2011.

Organiser of > 20 international conferences symposia and workshops/schools on electron crystallography, electron microscopy, crystallography and catalysis. The latest one was “International Symposium on Cryo-EM”, December 9, 2017, Stockholm with 120 participants from 10 countries.

Organisers of 4 international on electron microscopy and quasicrystals.

Opponent and members of PhD theses committees, expert in evaluation of professor promotions, reviewers of national research grants in Europe.

**F. Prize and awards**

Rådsprofessor of the Swedish Research Council, 2020-2030.

Wallenberg Scholars, 2019-2024.

Kungl. Vetenskapsakademiens (KVA) särskilda forskartjänster supported by Knut and Wallenberg Foundation (KAW), 2001-2005 (= current Wallenberg Academy Fellow)

Tage Erlander Prize for Science and Technology, given by the Royal Swedish Academy of Sciences (<http://www.kva.se>), 2002.

Göran Gustafsson Prize in Chemistry, given by the Royal Swedish Academy of Sciences, 2008.

Arrhenius medal 2012, given by the Swedish Chemical Society.

K.H. Kuo Award for Distinguished Scientist, 2010.

Sigrid Arrhenius stipend in 1995 for one of the best Ph.D. theses in Natural Sciences, SU.

**G. Invited lectures**

I have given 188 invited lectures at international conferences, schools and different laboratories. Some selected recent invited talks at international conferences/schools are listed below:

1. European Congress and Exhibition on Advanced Materials and Process (EUROMAT 2019), September 1-5, 2019, Stockholm
2. The American Crystallographic Association’s Annual Meeting (ACA2019), July 20-24, 2019, Cincinnati, USA
3. Annual UK Porous Materials, July 1-2, 2019, Cardiff University, UK
4. SCANDEM2019, June 11-14, 2019, Gothenburg, Sweden
5. Aminoff Symposium, April 1, Stockholm, 2019

6. 27th Annual Meeting of the German Crystallographic Society, March 25-28, 2019, Leipzig, Germany (**Plenary**)
7. 19th International Microscopy Congress, September 9-14, 2018, Sydney, Australia (**Keynote**).
8. International Symposium on Zeolites and Microporous Crystals, Aug. 5-9, 2018, Yokohama, Japan (**Plenary**).
9. 43<sup>rd</sup> Int. Conference on Coordination Chemistry, July 30- Aug. 4, Sendai, Japan (**Plenary**).
10. 16th European Powder Diffraction Conference, Edinburgh July 1-4, 2018.
11. Electron Crystallography-International School of Crystallography, June 1-10, 2018, Erice, Italy.
12. British Crystallographic Association Spring Meeting 2018, March 26-29, 2018, Warwick, UK.
13. 255<sup>th</sup> ACS National Meeting, March 18-22, 2018, New Orleans, USA.
14. CCP4 STUDY WEEKEND, January 10-12, 2018, Nottingham, UK.
15. Chinese National EM meeting, October 17-20, 2017 Chengdu, China (**Plenary**).
16. 24<sup>th</sup> Congress & General Assembly of the International Union of Crystallography, August 21-28, 2017, Hyderabad, India (**Keynote**).
17. The 16<sup>th</sup> European Conference on Solid State Chemistry, July 23-26, 2017, Glasgow, UK.
18. 11<sup>th</sup> Int. Symposium on the Characterization of Porous Solids, May 14-17, 2017, Avignon, France (**Keynote**).

## G. Publications

I have **302** publications including **260** original scientific papers in refereed journals (of which **258** published/accepted, **2** submitted), **16** original scientific papers in refereed conference proceedings, **5** books and **17** book chapters. I have also **10** software for quantitative analysis of high-resolution electron microscopy images and electron diffraction patterns and **five** patents.

Google scholar: 11034 citations, h-index: 56, i10-index: 189 (2019-12-11)

## H. Scientific track-record of Xiaodong Zou

### 1. Contributions to the establishment of electron crystallography

One important goal of my research has been to develop electron crystallographic methods for structure determination of complex structural problems that cannot be solved by other techniques. Although electron crystallography has already been recognized in life science since 1970s, as pioneered by Klug, Henderson and Unwin from Cambridge, it was not accepted in physical sciences. It was commonly believed that *“Electrons are scattered strongly by their interaction with the charges of electrons and nuclei, and so cannot be used to study the interiors of solid samples”*, as stated in the textbook Physical Chemistry, Atkins (4<sup>th</sup> edition, 1994). Since 1987, I have been working on developing electron crystallographic methods. We demonstrated that electron crystallography can be used for solving complex structures to high accuracy (*Nature* 1996) and solved a very complex quasicrystal approximant with > 1000 atoms in the unit cell (*Acta Cryst. A*, 2003). A major problem with the method was that it was very demanding in terms of expertise and time. The structure determination of the quasicrystal approximant took us **7 years!** A revolutionary breakthrough in electron crystallography was the development of the rotation electron diffraction (RED) method. Using the RED method, unknown inorganic structures could be solved in **7 hours** from data collection to structure solution. My group has determined more than 100 very complex inorganic and organic structures during the last four years, and holds the world-record in terms of number of solved inorganic structures and the structural complexity.

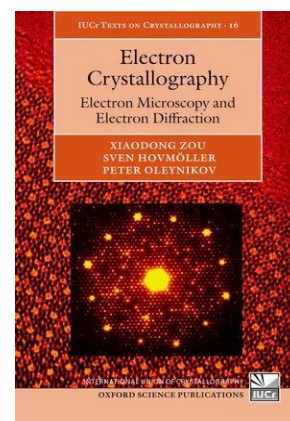


Fig. 1. The first textbook on electron crystallography of inorganic crystals by Zou et al. 2011.

In order to spread electron crystallography in physical sciences, I initiated the annual electron crystallography school series 1993 and organised seven such schools 1993-1999. I also implemented the electron crystallography school into the International School of Crystallography in Erice, and was the director of the schools 1997 and 2004. Now annual electron crystallography schools and Erice schools (every 7 years) have continued by the community and run both within and outside Europe. Today, structure determination by electron crystallography is generally accepted, and the textbooks are being revised.

## **2. Ability to propose and conduct ground-breaking research in new fields**

One of my goals was to apply the electron crystallographic methods on challenging materials problems. I identified zeolites and related porous materials as a field of interest for applying electron crystallography. In 1998, I built up the research activity on porous materials from scratch at SU. My group synthesized more than 100 new open-frameworks and metal-organic frameworks (MOFs) including the porous oxide crystals with the largest pores/lowest density (*Nature* 2005) and one of the very few chiral zeolite structures (*Nature Mater.* 2008). My experience in synthesis and characterization of porous materials was the key in the successful application of the 10-year grant (100 MSEK) from VR/VINNOVA 2006 to build up a new center of excellence, the Berzelii Center EXSELENT on Porous Materials at SU. I am now internationally recognized as a leading expert in the field of porous materials (plenary lectures, as council member). I have established collaboration with many internationally leading groups on zeolites and metal-organic frameworks, as well as major petrochemical companies worldwide (ExxonMobil, Chevron, Sinopec). Through EXSELENT, the research on porous materials has been expanded to many groups at Department of Materials and Environmental Chemistry (MMK) and Department of Organic Chemistry (OC), SU.

## **3. Establishing new research consortia and collaboration**

I have strong experience in establishing and leading large research consortia and collaboration with people in other fields. In 2006, I built up a new center of excellence, Berzelii Centre EXSELENT on Porous Materials and brought > 70 researchers from academia (MMK and OC, SU) and industry (14 companies) together. I was the director 2006-2012 and successfully established EXSELENT as an attractive research environment. I have taken EXSELENT through three successful evaluations by VINNOVA/VR and brought EXSELENT into one of the leading centers in porous materials and catalysis. My group has established long term collaboration with Profs. Bäckvall and Martín-Matute's groups at OC, SU in developing heterogeneous catalysts, which led to two new large KAW projects led by Prof. Bäckvall (2012-2016) and Prof. Martín-Matute (2017-2022). In 2013, I received a project grant (MATsynCELL) within the Röntgen-Ångström Cluster to build a consortium (25 persons from MMK and OC, SU and SLU) and collaborate with two German groups in synchrotron-based research. Through the collaboration, new research ideas and research directions have been generated, for example the use of EXAFS and in-situ cells for study of heterogeneous catalysts and catalytic reactions.

In 2012, I received a 5-year project grant 3D Electron Microscopy for Nanostructure Research (3DEM-NATUR) from KAW. This grant not only strengthened our internationally leading position in electron crystallography, but also made it possible to establish electron microscopy as one of the main research activities/tools in many groups at MMK and OC. More importantly, the grant made it possible to extend the research activity into life science and explore the feasibility of structure determination of protein crystals by electron diffraction. My group has established strong collaboration with Martin Högbom's group at Department of Biophysics and Biochemistry, SU. This initial effort has resulted in a recent 5-year grant as Wallenberg scholars from KAW

I have participated in several leadership trainings organized by VINNOVA and SU. I am now the deputy head of the MMK department and in charge of the strategy of the department. As the director, I promoted young researchers in EXSELENT to become leaders. Several of them have advanced to professors (3), associated professors (2) and assistant professors (2) in Sweden. I

successfully transferred the leadership of EXSELENT to a younger person as a director, and EXSELENT continued to be successful.