PERSONAL INFORMATION

Name: *Sara Bals*

orcid.org/0000-0002-4249-8017; Scopus ID: 6602082124; ResearcherID: B-8910-2011

Date of birth: *August 25th, 1977*

Nationality: *Belgian*

URL for web site: https://www.uantwerpen.be/en/staff/sara-bals/

Group web site: https://www.uantwerpen.be/en/research-groups/emat/

Host institution: University of Antwerp
Groenenborgerlaan 171, 2020 Antwerp, Belgium

- **EDUCATION**

1999 – 2003	PhD, Department of Physics, University of Antwerp, Belgium
1997 – 1999	Graduate studies in Physics, University of Antwerp, Belgium
1995 – 1997	Undergraduate studies in Physics, University of Antwerp, Belgium

- **CURRENT POSITION(S)**

2018 –	Full Professor, Physics Department, University of Antwerp, Belgium
2015 –	Director, Electron Microscopy for Materials Science, University of Antwerp, Belgium

- **PREVIOUS POSITION(S)**

2014 – 2018	Professor, Physics Department, University of Antwerp, Belgium
2012 – 2014	Associate Professor, Physics Department, University of Antwerp, Belgium
2007 – 2012	Assistant Professor, Physics Department, University of Antwerp, Belgium
2004 – 2007	Postdoctoral Fellowship of Flemish Research Council
2003 – 2004	Postdoctoral Fellowship at the National Center for Electron Microscopy, Lawrence Berkeley National Laboratory, Berkeley, California, USA

- **FELLOWSHIPS AND AWARDS**

2022 –	Member of Academia Europaea
2021	ACS Nano Lectureship Award, American Chemical Society
2020 –	Member of the Royal Flemish Academy of Belgium for Science and the Arts
2020	Quadrennial European Microscopy Award
2018 – 2024	ERC Consolidator Grant (REALNANO)
2017 – 2020	Francqui Research Professor, University of Antwerp
2016	Laureate of the Academy for Natural Sciences awarded by the Belgian Academy for Science and the Arts
2013 – 2018	ERC Starting Grant (COLOURATOM)
2007 – 2012	Postdoctoral Fellowship of Flemish Research Council

- **SUPERVISION OF GRADUATE STUDENTS AND POSTDOCTORAL FELLOWS**

13 ongoing PhD students, 21 completed: 1 is associate professor, 1 is on a tenure track position, 11 work at industry, 3 have permanent jobs as specialized technicians at universities and research centers, and 3 are postdocs.

Currently 9 postdocs, 22 completed: 1 is associate professor (China), 4 are on a tenure track position (Belgium, The Netherlands, France, China), 6 are senior researchers at major companies, 2 have

permanent jobs as specialized technicians at universities and research centers, many others are postdocs.

- **ORGANISATION OF SCIENTIFIC MEETINGS**

- Co-organizer of 20+ conferences, workshops and symposia at major conferences worldwide
- Member of the scientific advisory committees of 15+ international conferences

- **TEACHING ACTIVITIES**

2019 –	General Physics II for bachelor students in physics
2007 – 2018	General physics I, II and III for bachelor students in physics and mathematics Advanced Electron Microscopy for master students in physics Microscopy and Spectroscopy of Nanosystems for master students in physics Projects on Microscopy and Spectroscopy of Nanosystems for master students in physics

- **INSTITUTIONAL RESPONSIBILITIES**

2022 –	Member of the Promotion Commission of the Faculty of Science, University of Antwerp, Belgium
2019 –	Spokesperson of the NanoLab Centre of Excellence, University of Antwerp, Belgium
2015 –	Director, Electron Microscopy for Materials Science, University of Antwerp, Belgium
2010 –	Member of the Student Progress Commission, University of Antwerp, Belgium
2007 –	Member of the Physics Department Council, University of Antwerp, Belgium
2007 –	Member of the of the Science Faculty Committee, University of Antwerp, Belgium

- **REVIEWING ACTIVITES**

2023	Associate Editor, ACS Nano, American Chemical Society
2022	Evaluation Panel of DTU Energy
2021 –	Panel Member, PE4, ERC Starting Grants
2021 –	Editorial Advisory Board ACS Nanoscience Au
2021 –	Editorial Advisory Board Journal of Applied Physics
2020	Reviewer Fellowship Programme, La Caixa Foundation
2020 –	International Advisory Board Advanced Materials
2020 –	Editorial Advisory Board The Journal of Physical Chemistry
2019 –	W&T3 Panel Member Research Foundation Flanders
2019	Review panel H.C. Ørsted COFUND programme, DTU
2018 –	Editorial Advisory Board Particle and Particle Systems Characterization
2016	Review Board Member, Faculty of Applied Physics, University of Delft

- **CARREER BREAKS**

05/2006 – 08/2006	Maternity leave
05/2009 – 08/2009	Maternity leave

Sara Bals is an expert in the application and development of electron tomography for functional nanomaterials. By combining state-of-the-art electron microscopy with advanced 3D reconstruction algorithms, the positions and chemical nature of individual atoms in a nanomaterial are measured (Nature Materials 2012, Adv. Mat. 2022). These measurements are now also performed under realistic conditions including heating, liquid or gas flow (Nano Letters 2018, Acc. Chem. Res. 2021), which is essential for the further optimization of nanomaterials under working conditions. The importance of her work is reflected by the many results obtained in the framework of her ERC Starting grant

(COLOURATOM) in 2012, and her ongoing ERC Consolidator grant (REALNANO). In addition to her work on 3D imagining, Sara Bals and her team have significantly progressed the development of ultraclean graphene grids, which is a technology that is currently under patent application (EP2937313, EP2144711). These grids recently enabled the direct visualization of surface ligands (Nature, under review).

Publications from 2012-2023

399 publications, including: 5 Science, 1 PNAS, 3 Nat. Mater., 1 Nat. Physics, 1 Nat Chem., 1 Nat. Catal., 8 Nat. Commun., 1 Acc.Chem.Res., 1 Energy Environ. Sci., 12 JACS, 27 ACS Nano, 17 Nano Lett., 7 ACS Catal., 10 Angew. Chem., 7 Adv. Mater, 2 Adv. Funct. Mater., 26 Chem. Mat., 19 Ultramicroscopy

10 SELECTED PUBLICATIONS (out of 399 since 2012, cited >15,000 times)

* indicates corresponding author; citations are from Web of Science (core collection)

- M. Monai, K. Jenkinson, A. E. M. Melcherts, J. N. Louwen, E. A. Irmak, S. Van Aert, T. Altantzis, C. Vogt, W. van der Stam, T. Duchoň, B. Šmíd, E. Groeneveld, P. Berben, S. Bals,* B. M. Weckhuysen*, "Restructuring of titanium oxide overlayers over nickel nanoparticles during catalysis", Science **2023**, 380, 644-651 **DOI:** 10.1126/science.adf6984
- K. Jenkinson, L.M. Liz-Marzán*, S. Bals*, “Multimode Electron Tomography Sheds Light on Synthesis, Structure, and Properties of Complex Metal-Based Nanoparticles”, *Adv. Mater.* **2022,** *34, 2110394.* **DOI:** 10.1002/adma.202110394.
- W. Albrecht, S. Van Aert, S. Bals*, "Three-Dimensional Nanoparticle Transformations Captured by an Electron Microscope", *Acc. Chem. Res.* **2021**, *54,* 1189-1199. **DOI:** 10.1021/acs.accounts.0c00711.
- W. Albrecht*, E. Arslan Irmak, T. Altantzis, A. Pedrazo-Tardajos, A. Skorikov, T-S. Deng, J.E.S. van der Hoeven, A. van Blaaderen, S. Van Aert, S. Bals*, "3D Atomic-Scale Dynamics of Laser-Light-Induced Restructuring of Nanoparticles Unraveled by Electron Tomography", *Adv. Mater.* **2021**, *33*, 2100972. **DOI:** 10.1002/adma.202100972.
- G. González-Rubio, J. Mosquera, V. Kumar, A. Pedrazo-Tardajos, P. Llombart, D.M. Solís, I. Lobato, E.G. Noya, A. Guerrero-Martínez, J.M. Taboada, F. Obelleiro, L.G. MacDowell, S. Bals*, L.M. Liz-Marzán*, “Micelle-Directed Chiral Seeded Growth on Anisotropic Gold Nanocrystals”, *Science* **2020**, *368*, 1472-1477. **DOI:** 10.1126/science.aba0980.
- T. Altantzis, I. Lobato, A. De Backer, A. Béché, Y. Zhang, S. Basak, M. Porcu, Q. Xu, A. Sánchez-Iglesias, L.M. Liz-Marzán, G. Van Tendeloo, S. Van Aert, S. Bals*, "Three-Dimensional Quantification of the Facet Evolution of Pt Nanoparticles in a Variable Gaseous Environment", *Nano Lett.* **2019**, *19*, 477-481 DOI: 10.1021/acs.nanolett.8b04303.
- W. Albrecht, E. Bladt, H. Vanrompaey, J.D. Smith, S. Skrabalak, S.Bals*, "Thermal Stability of Gold/Palladium Octopods Studied in Situ in 3D: Understanding Design Rules for Thermally Stable Metal Nanoparticles", *ACS Nano* **2019,** *13*, 6522-6530. **DOI:** 10.1021/acsnano.9b00108
- T. Udayabhaskararao, T. Altantzis, L. Houben, M. Coronado-Puchau, J. Langer, R. Popovitz-Biro, L.M. Liz-Marzán, L. Vuković, P. Král, S. Bals S, Klajn R.* "Tunable Porous Nanoallotropes Prepared by Post-Assembly Etching of Binary Nanoparticle Superlattices", *Science* **2017,** *358,* 514-518. **DOI:** 10.1126/science.aan6046.
- M.P. Boneschanscher, W.H. Evers, J.J. Geuchies, T. Altantzis, B. Goris, F.T. Rabouw, S.A.P. van Rossum, H.S.J. van der Zant, L.D.A. Siebbeles, G. Van Tendeloo, I. Swart, J. Hilhorst, A.V. Pethukov, S. Bals, Vanmaekelbergh D.* "Long-Range Orientation and Atomic Attachment of Nanocrystals in 2D Honeycomb Superlattices", *Science* **2014,** *344*, 1377-1380. **DOI:** 10.1126/science.12526.
- B. Goris, S. Bals*, W. van den Broek, E. Carbó-Argibay, S. Gómez-Graña, L.M. Liz-Marzán, G. Van Tendeloo G. "Atomic-scale determination of surface facets in gold nanorods", *Nature Materials* **2012**, *11*, 930-935. **DOI:** 10.1038/nmat3462.

PATENTS

- A. Pedrazo-Tardajos, S. Bals, "Graphene layer transfer method", **EP 2937313**.
- A. Pedrazo-Tardajos, S. Bals, "Charged particle microscopy MEMS sample support", **EP 2144711**.

SELECTED RECOGNITIONS SINCE 2012

- Fellow of European Academy of Sciences and Academia Europaea (2022)
- Member of the Royal Flemish Academy of Belgium for Science and the Arts (2021)
- ACS Nano Lectureship Award (2021)
- Quadrennial European Microscopy Award (2020)
- Laureate of the Academy for Natural Sciences awarded by the Belgian Academy for Science and the Arts (2016)

10 SELECTED INVITED PRESENTATIONS

- **Invited Lecture at MRS Fall Meeting 2022**, Boston (USA), November 2022
- **Invited Lecture at 2nd Frontiers in Electron Microscopy for Physical and Life Sciences Nature Conference**, Princeton (USA), September 2022
- **Plenary Lecture at Scandem 2022,** online, June 2022
- **Award Lecture ACS Nano Lectureship**, online, December 2021
- **Plenary Lecture at 2021 MSC-SMC Symposium (Microscopical Society of Canada)**, online, June 2021
- **Award Lecture "European Microscopy Award 2020"**, online, August 2020
- **Plenary Lecture at Applied Nanotechnology and Nanoscience International Conference**, Paris, France, November 2019
- **Keynote Lecture at EUROMAT 2019**, Stockholm, Sweden September 2019
- **Plenary Lecture at International Conference on Tomography of Materials & Structures 2019**, Cairns, Australia, July 2019
- **Plenary Presentation at SCANDEM 2016**, Trondheim, Norway, June 2016

ORGANISATION OF INTERNATIONAL CONFERENCES (SELECTED)

- **Co-Chair** of Symposium "Multi-scale 3D imaging", at European Microscopy Congress, Copenhagen (Denmark), September 2024.
- **Co-Chair** of Symposium "3D imaging", at 20th International Microscopy Congress, Busan (South Korea), September 2023.
- **Co-Chair** of Symposium "Advances in In-Situ and Operando TEM Methods", at E-MRS, Strasbourg (France), May 2023.
- **Co-Chair** of Symposium "Multi-scale 3D imaging", at 19th International Microscopy Congress, Sydney (Australia), September 2018.
- **Co-Chair** of Symposium "Tomography and Multidimensional microscopy", at 16th European Microscopy Congress, Lyon (France), September 2016.
- **Organizer** of "International Workshop on Advanced Electron Microscopy", January 2005, 2007, 2009, 2011 and June 2013, 2015, 2017, 2019 University of Antwerp, Belgium

MAJOR CONTRIBUTIONS TO THE EARLY CAREERS OF EXCELLENT RESEARCHERS

Dr. Bart Goris, Dr. Eva Bladt and Dr. Hans Vanrompay received the PhD Award from the Belgian Microscopy Society after completing their thesis under the supervision of S. Bals.

Two supervised postdocs (Wiebke Albrecht and Da Wang) obtained MSCA Fellowships. Wiebke Albrecht was granted the Minerva Award 2021. Da Wang was granted the award of "Distinguished Young Scholar of the National Natural Science Foundation of China (Overseas)" in 2022.