

Prof. Dr. Maksym Yarema

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Education

- 05.2008 – 02.2012 **PhD in Chemical Engineering**, thesis on Nanoscience and Nanotechnology (honors)
Dept. of Solid State Physics, Johannes Kepler University Linz, Austria
Advisor: Prof. Dr. Wolfgang J. Heiss
- 08.2008 – 09.2008 **Visiting PhD student** in the group of Prof. Dr. Dmitri Talapin
Dept. of Chemistry, University of Chicago, USA
- 09.2002 – 07.2007 **BSc and MSc in Chemistry**, thesis on Intermetallic Compounds (honors)
Dept. of Chemistry, Ivan Franko National University of Lviv, Ukraine
Advisor: Prof. Dr. Roman E. Gladyshevskii
- 01.2007 – 02.2007 **Visiting master student** in the group of Prof. Dr. Thomas Fässler
Dept. of Chemistry, Technische Universität München, Germany
- 09.1991 – 05.2002 Chervonograd **Gymnasium**, Lviv region, Ukraine
Major in mathematics and natural sciences (honors)

Professional experience

- 01.2020 – 12.2024 **non-tenure track Assistant Professor** (ERC funded)
Chemistry and Materials Design Group, Institute for Electronics
Dept. of Information Technology and Electrical Engineering, ETH Zurich, Switzerland
- 08.2016 – 12.2019 **Senior Scientist** (Oberassistent) and **SNSF Ambizione Fellow**
Materials and Device Engineering Group, Institute for Electronics
Dept. of Information Technology and Electrical Engineering, ETH Zurich, Switzerland
- 11.2013 – 07.2016 **Postdoctoral Researcher**
Dept. of Information Technology and Electrical Engineering, ETH Zurich, Switzerland
Advisor: Prof. Dr. Vanessa C. Wood
- 03.2012 – 10.2013 **Marie Curie Postdoctoral Fellow**
Laboratory for Thin Films and Photovoltaics, EMPA, Dübendorf, Switzerland
Advisor: Prof. Dr. Maksym V. Kovalenko
- 05.2008 – 02.2012 **Research Project Assistant**
Dept. of Solid State Physics, Johannes Kepler University Linz, Austria
Advisor: Prof. Dr. Wolfgang J. Heiss
- 04.2007 – 01.2008 **Junior Technology Engineer**
Scientific division of FerozitTM building mixtures, Lviv, Ukraine
- 06.2005 – 08.2005 **Intern** at Helios GmbH
Production of household chemistry, Lviv, Ukraine

Awards

- 07.2022 Finalist of the **Falling Walls Science Breakthrough 2022** in Physical Sciences
- 04.2018 **Best Talk Award** at the 2018 MRS Spring Meeting, Symposium NM12, Phoenix, USA
- 07.2017 ACS Nano **Best Poster Award** at the NaNaX8: Nanoscience with Nanocrystals, Braga, Portugal
- 09.2014 QSIT **q-starter Award**, best business idea of the NCCR Quantum Science and Technology
- 01.2014 **Logo design winner**, Scientific Center for Optical and Electron Microscopy (ScopeM), ETH
- 09.2006 – 05.2007 DAAD **Leonhard Euler Scholarship**, exchange programme in TU Munich, Germany
- 05.2006 Undergraduate **Student Award**, top-3 student of Dept. Chemistry, University of Lviv, Ukraine
- 1999 – 2002 Winner of **Chemistry Olympiads** (regional & all-Ukrainian levels), silver medal in 2000 – 7th rank

Funding

The total amount of funding awarded to date is 2 399 000 EUR

01.2020 – 12.2024	ERC Starting Grant , European Research Council, 1 604 000 EUR, PI
02.2018 – 06.2020	ETH Innovedum Teaching Grant , Teaching Commission of the ETH Zurich, 60 000 CHF, PI
05.2017 – 04.2018	QSIT Knowledge and Technology Transfer Grant , National Centre of Competence in Research “QSIT – Quantum Science and Technology”, 80 000 CHF, co-PI
08.2016 – 07.2019	SNSF Ambizione Fellowship (Schweizerische Nationalfonds zur Förderung der wissenschaftlichen Forschung), 455 000 CHF, PI
03.2012 – 02.2014	Marie Curie EMPA Postdocs Grant (European Commission, Cofund Programme), 200 000 CHF, project leader

Teaching experience

2022 – present	227-0621-00L Emerging Memory Technologies , master level, 3 ECTS
2020 – present	227-0669-00L Chemistry of Devices and Technologies , bachelor level, 4 ECTS
2016 – 2021	227-0085-23L Phase Change Materials and Memories , bachelor level, 1 ECTS
12.2019	Tutorial lecture Tailor-Made Chalcogenide Colloids: Tuning Size, Composition and Structure of Nanomaterials at the 2019 MRS Fall Meeting & Exhibit, US
05.2018	Tutorial lecture on PCM Applications of Colloidal Nanomaterials , PhonSi Workshop, Friedrich-Alexander Universität Erlangen-Nürnberg, Germany
11.2016	Workshop on Crystal Structure Visualization: Best Practices and Introduction to Diamond Crystal Impact Software , ETH, bachelor and master level
2015 – 2019	Guest lecture Synthesis of Materials for Optoelectronic Applications and laboratory component for “Organic and Nanostructured Optics and Electronics”, ETH, master level
2013 – 2018	Guest lecture Quasicrystals for “Functional Inorganics”, ETH, master level

Supervision experience

3 PhD students	Dhananjeya Kumar (2020 – present), Florian M. Schenk (2021 – present), Simon Wintersteller (2021 – present)
12 master students	Chun-Wei Chang (2023), Hanglin He (2023), Tristan Sachsenweger (2023), Matthias Can (2022), Simon Wintersteller (2021), Ho-Yun Lee (2021), Jasper Clarysse (2018), Vladimir Ovuka (2018), Augustin Zaininger (2017), Annina Moser (2017), Alexandra Turrini (2015), Peter Benedek (2015)
18 research projects	Lara Perren (2024), Chun-Wei Chang (2022), Xuandong Kou (2022), Hyeon Ko (2022), Zili Zhang (2022), Darijan Boskovic and Nathan Pharizat (2021), Roy Bernini (2021), Anina Saiko (2021), Matthias Can (2021), Simon Wintersteller (2020), Aris Mukherjee (2020), Sunniva Flück and Jaye Plüss (2020), Jasper Clarysse (2017), Kaja Jentner and Laura Rutishauser (2017), Yunhua Xing (2016), Thomas Maurer (2016), Nils Wenzler (2014), Karla Lienau (2013)
7 PhD co-advisor	Joel Casella (Romanyuk Lab, EMPA, 2022 – present), Raphael Schwanninger (Leuthold Lab, ETHZ, 2024), Mahsa Parvizian (De Roo Lab, Uni Basel, 2023), Annina Moser (Wood Lab, ETHZ, 2023), Mariano Calcabrini (Ibáñez Lab, ISTA, 2023), Laia Castilla i Amorós (Buonsanti Lab, EPFL, 2022), Antonio Cabas Vidani (Tiwari Lab, EMPA, 2020)

Highlights

09.2023	Silver Poster Award for Florian Schenk at the EPCOS 2023 – European Phase Change and Ovonic Symposium, Rome, Italy
06.2023	Best Talk Award for Florian Schenk at the 1 st Symposium on Materials Chemistry, Swiss Chemical Society (SCS), Dübendorf, Switzerland
07.2021	Master thesis of Jasper Clarysse is a basis of J. Clarysse et al., <i>Sci. Adv.</i> 2021 , 7, eabg1934
10.2017	Master thesis of Annina Moser is published at A. Moser et al., <i>J. Phys. Chem. C</i> 2017 , 121, 24345
09.2017	Semester project of Yunhua Xing is a basis of M. Yarema, Y. Xing, et al., <i>Sci. Rep.</i> 2017 , 7, 11718
02.2017	Master thesis of Peter Benedek is a basis of P. Benedek et al., <i>RSC Adv.</i> 2017 , 7, 17763

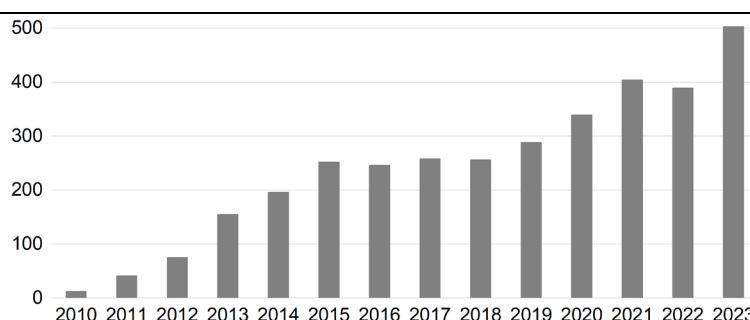
Academic commitments

08.2023	Scientific Program Committee member of IUPAC CHAINS2023 conference, theme “Smart & Energy Materials”
06.2023 – present	Advisory Board member for Materials and Processes (MaP) Competence Center, ETH Zurich
02.2023	Selection Committee member for the MSCA4Ukraine (European Commission initiative in frame of Marie Skłodowska-Curie Actions, 124 grants for displaced researchers from Ukraine)
01.2023 – present	Editorial Advisory Board in ACS Applied Nano Materials
04.2022 – present	Associate Editor for Frontiers in Chemistry, section Nanoscience
03.2021 – 03.2023	Chair of three annual nanoGe Spring Meetings, Symposium “Chemistry of Nanomaterials”
11.2019	Chair of nanoGe Fall Meeting 2019, Symposium “Charge Carrier Dynamics”
02.2018 – 05.2019	Guest Editor for Frontiers in Chemistry. Research Topic “Colloidal Semiconductor Nanocrystals”

Summary of publication list

77 peer-reviewed publications

- 70 original research articles
- 4 review articles
- 14 articles as a corresponding author



Selected publications

S. Wintersteller, O. Yarema, D. Kumaar, F. M. Schenk, O. Safonova, P. M. Abdala, V. Wood, and **M. Yarema***. Unravelling the Amorphous Structure and Crystallization Mechanism of GeTe Phase Change Memory Materials. *Nature Commun.* **2024**, *15*, 1011.

F. M. Schenk, T. Zellweger, D. Kumaar, D. Bošković, S. Wintersteller, P. Solokha, S. De Negri, A. Emboras, V. Wood, and **M. Yarema***. Phase-Change Memory from Molecular Tellurides. *ACS Nano* **2024**, *18*, 1, 1063-1072.

O. Yarema, A. Moser, C.-W. Chang, J. Clarysse, F. M. Schenk, E. Egüz, H. Vemulapalli, N. Mittal, E. Edison, Y.-H. Wu, D. A. Kuznetsov, C. R. Müller, M. Niederberger, C. M. Franck, V. Wood, and **M. Yarema***. Palladium Zinc Nanocrystals: Nanoscale Amalgamation Enables Multifunctional Intermetallic Colloids. *Adv. Funct. Mater.* **2023**, 2309018.

D. Kumaar, M. Can, K. Portner, H. Weigand, O. Yarema, S. Wintersteller, F. M. Schenk, D. Boskovic, N. Pharizat, R. Meinert, E. Gilshtein, Y. Romanyuk, A. Karvounis, R. Grange, A. Emboras, V. Wood, and **M. Yarema***. Colloidal Ternary Telluride Quantum Dots for Tunable Phase Change Optics in the Visible and Near-Infrared. *ACS Nano* **2023**, *17*, 6985-6997.

J. Clarysse, A. Moser, O. Yarema, V. Wood, and **M. Yarema***. Size- and Composition-Controlled Intermetallic Nanocrystals via Amalgamation Seeded Growth. *Sci. Adv.* **2021**, *7*, eabg1934.

O. Yarema, A. Perevedentsev, V. Ovuka, P. Baade, S. Volk, V. Wood, and **M. Yarema***. Colloidal Phase-Change Materials: Synthesis of Monodisperse GeTe Nanoparticles and Quantification of Their Size-Dependent Crystallization. *Chem. Mater.* **2018**, *30*, 6134-6143.

M. Yarema*, O. Yarema, W.M.M. Lin, S. Volk, N. Yazdani, D. Bozyigit, and V. Wood. Upscaling Colloidal Nanocrystal Hot-Injection Syntheses via Reactor Underpressure. *Chem. Mater.* **2017**, *29*, 796-803.

M. Yarema, M. Wörle, M.D. Rossell, R. Erni, R. Caputo, L. Protesescu, K.V. Kravchyk, D.N. Dirin, K. Lienau, F. von Rohr, A. Schilling, M. Nachtegaal, and M.V. Kovalenko. Monodisperse Colloidal Gallium Nanoparticles: Synthesis, Low Temperature Crystallization, Surface Plasmon Resonance and Li-Ion Storage. *J. Am. Chem. Soc.* **2014**, *136*, 12422-12430.

M. Yarema*, S. Pichler, M. Sytnyk, R. Seyrkammer, R.T. Lechner, G. Fritz-Popovski, D. Jarzab, K. Szendrei, R. Resel, O. Korovyanko, M.A. Loi, O. Paris, G. Hesser, and W. Heiss. Infrared Emitting and Photoconducting Colloidal Silver Chalcogenide Nanocrystal Quantum Dots from a Silylamide-Promoted Synthesis. *ACS Nano* **2011**, *5*, 3758-3765.

M. Yarema*, M.V. Kovalenko, G. Hesser, D.V. Talapin, and W. Heiss. Highly Monodisperse Bismuth Nanoparticles and Their Three-Dimensional Superlattices. *J. Am. Chem. Soc.* **2010**, *132*, 15158-15159.

Languages

English (fluent C2), German (intermediate B2), Ukrainian (native)

Personal

Born October 27, 1985 in Ukraine, married, 2 children, hobbies: music and scientific data visualization

Invited talks

2023	Department of Material Science, Friedrich-Alexander Universität Erlangen-Nürnberg, Germany
2023	Physics Colloquium, Johannes Kepler University Linz, Austria
2023	Conference NaNaX10, Nanoscience with Nanocrystals, Austria
2023	Zernike Institute for Advanced Materials, University of Groningen, the Netherlands
2023	Institute of Science and Technology, Austria
2023	Innovation Day: World-saving technologies, ETH Zurich and the Embassy of Switzerland to Ukraine
2022	Institute of Chemical Sciences and Engineering, EPF Lausanne, Switzerland
2022	Spring Meeting of the European Materials Research Society (E-MRS), France (online)
2022	School of Chemical Engineering, University of New South Wales, Australia (online)
2021	Zernike Institute for Advanced Materials, University of Groningen, the Netherlands (online)
2021	Inaugural Lecture at ETH Zurich, Switzerland
2021	Swiss Academy of Natural Sciences (Platform Chemistry), Switzerland
2021	Conference FMIE-2021: Functional Materials for Innovative Energy, National Academy of Sciences, Ukraine
2020	ETH Industry Week 2020, ETH Zurich, Switzerland
2020	Dept. of Chemistry, University of Lviv, Ukraine
2020	Institute of Science and Technology, Austria
2019	Symposium EL04 of the 2019 MRS Fall Meeting & Exhibit, United States
2019	Dept. of Materials, ETH Zurich, Switzerland
2018	Dept. of Physics, RWTH Aachen University, Germany
2018	PhonSi Workshop, Friedrich-Alexander Universität Erlangen-Nürnberg, Germany
2017	Dept. of Physical Chemistry, Technische Universität Dresden, Germany
2014	Dept. of Physics, Montanuniversität Leoben, Austria
2012	Dept. of Chemistry, University of Lviv, Ukraine

Conference contributions

2023	IMC, International Conference on Crystal Chemistry of Intermetallic Compounds, Ukraine (talk, online)
2023	European Phase Change and Ovonic Symposium, Italy (talk)
2022	HYMA, International Conference on Multifunctional, Hybrid and Nanomaterials, Italy (talk)
2022	ISHHC19 International Symposium on Homogeneous and Heterogeneous Catalysis, Norway (talk, online)
2021	ACS National Fall Meeting, United States (talk, online)
2021	iNCNC, Online Internet NanoGe Conference on Nanocrystals (talk, online)
2019	MRS Fall Meeting, United States (talk)
2018	MRS Spring Meeting, United States (3 talks, best talk award)
2018	European Phase Change and Ovonic Symposium, Italy (poster)
2017	Swiss Chemical Society Fall Meeting, Switzerland (poster)
2017	Austrian Chemistry Days, Annual Meeting of GÖCH, Austrian Chemical Society, Austria (talk)
2017	NaNaX8, Nanoscience with Nanocrystals, Portugal (2 posters, best poster award)
2017	E-MRS, Spring Meeting of the European Materials Research Society, France (talk and poster)
2016	Swiss Chemical Society Fall Meeting, Switzerland (talk)
2015	MRS Spring Meeting, United States (talk)
2014	NaNaX6, Nanoscience with Nanocrystals, Austria (talk)
2013	63rd Lindau Nobel Laureate Meeting, Chemistry, Germany (attendee, competitive selection basis)
2012	CSX, Workshop on Simultaneous Combination of Spectroscopies with X-ray Techniques, Switzerland (poster)
2011	Gordon Research Conference on Clusters, Nanocrystals and Nanostructures, United States (poster)
2010	NaNaX4, Nanoscience with Nanocrystals, Germany (talk)
2010	QD2010, Quantum Dot conference, United Kingdom (talk)
2007	IMC, International Conference on Crystal Chemistry of Intermetallic Compounds, Ukraine (poster)