

University Academic Curriculum Vitae

Personal information Philip Ingenhoven (PhD)

Education since leaving school

- 2005 Diplom (Masters equivalent) in Physics Heinrich Heine University Düsseldorf
- 2010, PhD in Theoretical Physics “Spin-dependent electronic and transport properties of unconventional conductors ” (Massey University New Zealand)

Present appointment

- Grant Funded Researcher
- March 2020
- Level of appointment (Grant Funded Researcher A)
- employer (University of Adelaide)
- Simulation of solar and other renewable energy solutions in an economical context. Energetic evaluation of possible solutions providing energy for high temperature industrial processes

Chronological list of all previous employments (each with job title, starting and finishing dates, level, employer, responsibilities)

Professional experience

From / to	Job title	Name of academic Institution	Academic level	responsibilities
2011-2013	Postdoctoral Fellow	University of Trento	Post doc	Work package leader for EU project
2013-2018	Senior Researcher	EURAC research	Senior researcher	Conduct research and acquire funding Solar PV
2014-2020	Contract Professor	Free University of Bolzano	Lecturer / Supervisor of Master's theses	Lecturing and Master's project management
2018	Consultant	Aerial PV Inspection	Consultant	Feasibility study
2019	External Consultant	UNIPER SE	Consultant	Business Development for Solar energy systems
2020	Grant-Funded Researcher	Centre for Energy Technology (CET) - University of Adelaide	Research Fellow	Techno-economic assessment of solar de-carbonization option for high temperature industrial processes

Participation in exhibitions (where applicable)

- 35th European PV Solar Energy Conference and Exhibition – Brussels, Belgium, 24 - 28 September 2018
- NREL 2018 PV Reliability Workshop Denver
- Invited Speaker: 13. Österreichische Photovoltaik-Tagung, Schwaz, PV Austria 2015 „
- E-MRS Spring Meeting 2012, Strasbourg, France: "
- 33rd European Photovoltaic Solar Energy Conference and Exhibition (2017)
- 32nd European Photovoltaic Solar Energy Conference and

- Exhibition (2016).
- 31st European Photovoltaic Solar Energy Conference and Exhibition (2015)
- 10th Energy Forum, 3-4 November 2015, Bern
- 28th European Photovoltaic Solar Energy Conference and Exhibition (2013). doi:10.4229/28thEUPVSEC2013-4AV.5.25
- 27th European Photovoltaic Solar Energy Conference and Exhibition (2012). doi:10.4229/27thEUPVSEC2012-1BV.8.9

Experience in academic teaching

Teaching Experience

- Since 2014 Lecturer in the Masters of Energy Engineering: Solar Energy Systems, Free University Bolzano.
- Since 2015 Supervision of Master's students in energy research, Free University Bolzano.
- 2011-2013 Mentoring of PhD students of photovoltaic research, University of Trento.

Memberships

- Deutsche Physikalische Gesellschaft (Working Group Energy)
- International Solar Energy Society

Publications

Peer Reviewed Publications

- P. Ingenhoven, G. Belluardo, and D. Moser, "Comparison of Statistical and Deterministic Smoothing Methods to Reduce the Uncertainty of Performance Loss Rate Estimates," *IEEE Journal of Photovoltaics*, vol. 8, no. 1, pp. 224 - 232, 2018. DOI: 10.1109/JPHOTOV.2017.2762523
- R. Pinotti, S. Avesani, A. Belleri, G. D. Michele, and P. Ingenhoven, "Optimised Parametric Model of a Modular Multifunctional Climate Adaptive Facade for Shopping Centers Retrofitting," *Journal of Facade Design and Engineering*, vol. 5, no. 1, pp. 23–36, Jan. 2017. DOI: 10.7480/jfde.2017.1.1421
- F.Sgrignuoli, P.Ingenhoven, G.Pucker, V.D.Mihailetchi, E.Froner, Y.Jestin, E.Moser, G.Sánchez, L.Pavesi, "Purcell effect and luminescent downshifting in silicon nanocrystals coated back-contact solar cells," *Solar Energy Materials and Solar Cells*, vol. 132, pp. 267–274, Jan. 2015. DOI: 10.1016/j.solmat.2014.09.007
- G. Belluardo, P. Ingenhoven, W. Sparber, J. Wagner, P. Weihs, and D. Moser, "Novel method for the improvement in the evaluation of outdoor performance loss rate in different PV technologies and comparison with two other methods," *Solar Energy*, vol. 117, pp. 139–152, Jul. 2015. DOI: 10.1016/j.solener.2015.04.030
- P. Ingenhoven, G. Belluardo, D. Moser, and W. Sparber, "Sun Tracker Performance Analysis for Different Solar Module Technologies in an Alpine Environment," *Journal of Solar Energy Engineering-Transactions of the ASME*, vol. 136, no. 3, p. 031005, Aug. 2014. DOI: 10.1115/1.4026253
- P. Ingenhoven, A. Anopchenko, A. Tengattini, D. Gandolfi, F. Sgrignuoli, G. Pucker, Y. Jestin, L. Pavesi, and R. Balboni, "Quantum effects in silicon for photovoltaic applications," *Physica Status Solidi A - Applications and Materials Science*, vol. 210, no. 6, pp. 1071–1075, Jun. 2013. DOI: 10.1002/pssa.201200939
- F. Sgrignuoli, G. Paternoster, A. Marconi, P. Ingenhoven, A. Anopchenko, G. Pucker, and L. Pavesi, "Modeling of silicon nanocrystals based down-shifter for enhanced silicon solar cell performance," *Journal of Applied Physics*, vol. 111, no. 3, pp. 034303-034303-7, Feb. 2012. DOI: doi:10.1063/1.3679140

- P. Ingenhoven, J. Z. Bernád, U. Zülicke, and R. Egger, "Features due to spin-orbit coupling in the optical conductivity of single-layer graphene," *Phys. Rev. B*, vol. 81, no. 3, p. 035421, Jan. 2010. DOI: 10.1103/PhysRevB.81.035421
- Schulz, A. De Martino, P. Ingenhoven, and R. Egger, "Low-energy theory and RKKY interaction for interacting quantum wires with Rashba spin-orbit coupling," *Phys. Rev. B*, vol. 79, no. 20, p. 205432, May 2009. DOI: 10.1103/PhysRevB.79.205432
- P. Ingenhoven, R. Egger, and U. Zülicke, "Spin transport and bipolaron density in organic polymers," *Journal of Physics: Condensed Matter*, vol. 21, no. 41, p. 415302, Oct. 2009. DOI: 10.1088/0953-8984/21/41/415302

Conference Talks

- M. Dallapiccola, P. Ingenhoven, D. Moser "Simplified method for partial shading losses calculation for series connected PV modules with experimental validation" 35th European PV Solar Energy Conference and Exhibition – Brussels, Belgium, 24 - 28 September 2018
- P. Ingenhoven, G. Belluardo, S. Lindig, D. Moser "Understanding the time evolution of PVGIS performance model parameters and the temperature coefficients" 35th European PV Solar Energy Conference and Exhibition – Brussels, Belgium, 24 - 28 September 2018
- S. Lindig, P. Ingenhoven, G. Belluardo, D. Moser, M. Topic "Evaluation of Technology-Dependent Maximum Power Point Current and Voltage Degradation in a Temperate Climate" 35th European PV Solar Energy Conference and Exhibition – Brussels, Belgium, 24 - 28 September 2018
- Invited Speaker: NREL 2018 PV Reliability Workshop Denver "Uncertainty reduction of Performance Loss Rate Estimates"
- Invited Speaker: 13. Österreichische Photovoltaik-Tagung, Schwaz, PV Austria 2015 „BIPV in Südtirol/Trentino“, and participation in the subsequent panel discussion.
- Invited Speaker: E-MRS Spring Meeting 2012, Strasbourg, France: Symposium A, "Quantum effects in silicon for photovoltaic applications"

Conference Contributions

- D. Moser, C. Cornaro, P. Ingenhoven, M. Pierro, & G. Belluardo, "Statistical Analysis of the Performance Loss Rate of PV Plants Distributed in a Region: A Real-Case Study in South Tyrol." 33rd European Photovoltaic Solar Energy Conference and Exhibition (2017). doi:10.4229/EUPVSEC20172017-6BO.7.2
- P. Ingenhoven, G. Belluardo, & D. Moser "Comparison of Various Models for the Estimation of the Performance Loss Rate of Seven PV Technologies over Five Years in Alpine Climate." 32nd European Photovoltaic Solar Energy Conference and Exhibition (2016). doi:10.4229/EUPVSEC20162016-5BV.2.33
- P. Ingenhoven, G. Barchi, M. Lovati, & D. Moser "Photovoltaic Plant Orientation Strategies to Minimize Grid Exchange in Free Field and Building Integrated Setups." 32nd European Photovoltaic Solar Energy Conference and Exhibition (2016). doi:10.4229/EUPVSEC20162016-6AV.4.26
- G. Belluardo, P. Ingenhoven, & D. Moser "Evaluation of Soiling during a 2-Months Drought and Construction Works Near a PV Test Facility in North-East of Italy." 32nd European Photovoltaic Solar Energy Conference and Exhibition (2016).

doi:10.4229/EUPVSEC20162016-5BV.2.46

- M. Lovati, G. Belluardo, P. Ingenhoven, L. Maturi, & D. Moser "Independent Verification of a Method Using Free Software for Simulation of Complex Shaped Photovoltaics." 31st European Photovoltaic Solar Energy Conference and Exhibition (2015). doi:10.4229/EUPVSEC20152015-5BV.2.50
- P. Ingenhoven, M. Lovati, L. Maturi, & D. Moser "PV Production and Wiring Strategies on Complex Shapes." 31st European Photovoltaic Solar Energy Conference and Exhibition 31st European Photovoltaic Solar Energy Conference and Exhibition (2015). doi:10.4229/EUPVSEC20152015-6AV.5.17
- P. Ingenhoven, G. Belluardo, W. Bresciani, & D. Moser, "Support Tool to Evaluate Year to Year Plant Performance where Irradiance Data is not Available." 31st European Photovoltaic Solar Energy Conference and Exhibition (2015). doi:10.4229/EUPVSEC20152015-5BV.1.18
- M. Lovati, P. Ingenhoven, G. De Michele, L. Baglivo, L. Maturi, D. Moser, "Energy, daylight and thermal analysis of a geodesic dome with photovoltaic envelope", 10th Energy Forum, 3-4 November 2015, Bern
- L. Kronthaler, S. Weber, P. Ingenhoven, L. Alberti, & D. Moser, "Temperature Dependence of Shunt and Series Resistances of Different PV Module Technologies." 28th European Photovoltaic Solar Energy Conference and Exhibition (2013). doi:10.4229/28thEUPVSEC2013-4AV.5.25
- G. Belluardo, P. Ingenhoven & D. Moser, "Medium-Term Degradation of Different Photovoltaic Technologies under Outdoor Conditions in Alpine Area." 28th European Photovoltaic Solar Energy Conference and Exhibition (2013). doi:10.4229/28thEUPVSEC2013-5BV.7.76
- F. Sgrignuoli, Y. Jestin, E. Moser, P. Ingenhoven, G. Pucker, L. Pavesi, "Silicon Nanocrystals for Downshifting Applications: A Preliminary Study." 27th European Photovoltaic Solar Energy Conference and Exhibition (2012). doi:10.4229/27thEUPVSEC2012-1BV.8.9
- V.D. Mihailetchi, G. Galbiati, L.J. Koduvelikulathu, R. Kopecek, Y. Jestin, G. Pucker, P. Ingenhoven, L. Pavesi, J.P. Connolly, G. Sánchez, "Screen Printed IBC Solar Cells with Silicon Quantum Dots Down Shifter Layer." 27th European Photovoltaic Solar Energy Conference and Exhibition (2012). doi:10.4229/27thEUPVSEC2012-2BV.6.51

Reports

- Characterization of Performance of Thin-film Photovoltaic Technologies, T.J. Silverman, U. Jahn, G. Friesen, M. Pravettoni, M. Apolloni, A. Louwen, W.G.J.H.M. van Sark, M. Schweiger, G. Belluardo, J. Wagner, A. Tetzlaff, P. Ingenhoven, D. Moser, IEA PVPS Task 13, Report IEA-PVPS T13-02:2014
- Uncertainties in PV System Yield Predictions and Assessments, C. Reise, B. Müller
- D. Moser, G. Belluardo, P. Ingenhoven, A. Driesse, G. Razongles, M. Richter, IEA PVPS Task 13, Subtasks 2.3 & 3.1, Report IEA-PVPS T13-12:2018
- Anopchenko, F. J. Aparicio Rebollo, P. Bettotti, F. Bianco, P. Bellutti, M. Cazzanelli, K. Fedus, E. Froner, D. Gandolfi, M. Ghulinyan, N. Kumar, Y. Jestin, P. Ingenhoven, S. Larcheri, L. Lunelli, M. Mancinelli, A. Marconi, E. Moser, L. Pasquardini, C.

Pederzolli, C. Potrich, N. Prtljaga, G. Pucker, F. Ramiro Manzano, E. Rigo, M. Scarpa, F. Sgrignuoli, A. Tengattini, L. Pavesi, "La Nanofotonica in Silicio e la Fotonica con il Nanosilicio, Una piattaforma per ampliare il successo della fotonica in silicio", Il Nuovo Saggiatore, vol. 28 / No 1-2 2012

Book Contributions

- Maturi, L. & Adami, J. Building Integrated Photovoltaic (BIPV) in Trentino Alto Adige. (Springer International Publishing, 2018) ISBN 978-3-319-74115-4

Entrepreneurship

Freelance Renewable Energy Consulting Business started in 2018

Statement of interest

After delivering the course I am applying for now. I have a great motivation to share my extensive knowledge of solar energy systems with young and motivated people. I have academic research experience but I have recently worked in a business and industrial environment and have very practical knowledge on the subject matter. I can contribute in theoretical and practical ways to the student education. Further, I still have good links to EURAC research so I can provide Master's thesis opportunities for students. In my previous course I have organized field trips to the EURAC labs and the silicon production facility in Merano I am planning to keep these visits up.

Language competence

- German (mother tongue)
- English (near mother tongue)
- Italian (advanced)