

Prof. Dr.-Ing. habil. Andreas Fischer

Head of the Bremen Institute for Metrology, Automation and Quality Science
Faculty of Production Engineering
University of Bremen, Germany



born January 27, 1980 in Dresden, Germany

Professional career

- Full Professor at University of Bremen, Germany
Head of the Bremen Institute for Metrology, Automation and Quality Science: since 08/2016
- Certificate for University Didactics at the Saxon center for University Didactics (professional development): 2013-2016
- Laboratory for Measurement and Sensor System Techniques, Technische Universität Dresden:
 - head of the group „Measurement system techniques“: 2009-2016
 - cooperations, e.g., with the national metrology institute (Physikalisch-technische Bundesanstalt) in Braunschweig, the german aerospace centers (Deutsches Zentrum für Luft- und Raumfahrt) in Cologne and Berlin, the Technical University of Graz, Austria: 2006-2016
 - phd study and research associate: 2006-2009
 - startup phase of the newly assigned chair: 2005-2006
- Institut for Control Theory, Technische Universität Dresden (research assistant): 2004-2005
- Robert Bosch GmbH (chassis systems; internship): 2003-2004
- InfraTec GmbH (infrared measurement technology; part-time work): 2000-2003
- Bundeswehr (basic military service): 1999-2000
- InfraTec GmbH (infrared sensor systems; internship): 1999
- Study of electrical engineering, Technische Universität Dresden (specialisation: automation and control): 1998-1999 and 2000-2004

Academic record from the Technische Universität Dresden, Germany

2013	Habilitation degree for metrology (faculty of electrical and computer engineering)	
2009	Ph.D. degree of electrical engineering (Dr.-Ing.)	(summa cum laude)
2004	Diploma of electrical engineering (Dipl.-Ing.)	(passed with distinction)

Awards and scholarships

- Best Student Paper Award at the conference “Sensoren und Messsysteme”:
M. Schuster, R. Kuschmierz, A. Fischer, J. Czarske: *Messunsicherheitsuntersuchungen zur nicht-inkrementellen Formmessung von rotierenden Objekten*, 2016.
- Selected article as “Highlights 2014 of Measurement Science and Technology”:
R. Kuschmierz, J. Czarske, A. Fischer: *Multiple wavelength interferometry for distance measurements of moving objects with nanometer uncertainty*, Meas. Sci. Technol. 25(8):085202, 2014.
- Dr. Meyer-Struckmann-Science award 2009 of the BTU Cottbus
(for recognizing the outstanding scientific achievements)
- Measurement Technique Prize 2010 of the Society of University Professors of Measurement Technique (AHMT e.V.)
(for recognizing the outstanding dissertation)
- Heinrich-Barkhausen-Award 2010 of the faculty of electrical and computer engineering
(for recognizing the outstanding dissertation)
- Dissertation award 2010 of the Commerzbank
(for recognizing the dissertation as one of the best at the Technische Universität Dresden)
- Scholarship of the German Merit Foundation (Studienstiftung des deutschen Volkes) (2002-2004)
- Philips-Award for outstanding achievements in the intermediate diploma (2002)
- Fellowship of the Siemens Student Program (2002-2004)

Research

1. Model-based multi-sensor-systems for high-speed in-situ and in-process measurements (e.g. 3D shape, vibration and surface measurements in production engineering, material science and energy related research of engines and turbines)
2. Traceable geometric measurements of large and small scale objects ranging from m to nm (e.g. contactless, laser-based technologies for surface metrology)
3. Dynamic, camera-based measurement systems for the non-intrusive investigation of fast, unsteady phenomena in non-reactive and reactive turbulent flows (aerodynamics, aeroacoustics, thermoacoustics, sprays, fuel injection and combustion processes)
4. Novel measurement systems using high-speed cameras, modulation/multiplexing techniques, computational optics, MEMS and adaptive optics (theory and modeling for identifying and beating the limits of measurability, uncertainty relations, Cramér-Rao bounds, as well as experiments and applications)

System engineering and theory for fast novel measurement and sensor system techniques: from the sensor development, realisation, characterisation, cutting edge demonstration experiments in the lab to real-world applications in the fab. Experimental and theoretical investigations on the measurement uncertainty allow surpassing precision for gaining improved or new production technologies, triggering new products as well as obtaining new insights in fundamental scientific questions.

Author or co-author of 8 books/book contributions, >120 peer-reviewed journal papers, >200 conference/workshop/seminar contributions, 4 patents and 19 (co-)invited talks.

Organization of conferences

- Laser methods in flow measurement techniques (conference series of Gala e.V.) in Bremen, 7.-9.9.2021
- „XXXII. Messtechnisches Symposium“ in Bremen, 20.-21.9.2018
- Laser methods in flow measurement techniques (conference series of Gala e.V.) in Dresden, 8.-10.9.2015

Memberships

Guest Editor of Applied Sciences for the Special Issue “Optical In-Process Measurement Systems”; Editor of the Journal „Nanomanufacturing and Metrology“; Member of The international society for optics and photonics (SPIE); European Optical Society (EOS); The Optical Society (OSA); German Society of Applied Optics (DGaO), Institute of Electrical and Electronics Engineers (IEEE); Association of German Engineers (VDI), German Association for Laser Anemometry (GALA), Society of University Professors of Measurement Technique (AHMT)

Publications – Selection of 10 papers in peer reviewed international journals

- 1) G. Behrends, D. Stöbener, A. Fischer: Integrated, speckle-based displacement measurement for lateral scanning white light interferometry. *Sensors* 21(7):2486 (17 pp.), 2021.
- 2) A. Fischer, M. Mikulewitsch, D. Stöbener: Indirect fluorescence-based in situ geometry measurement for laser chemical machining. *CIRP Annals - Manufacturing Technology* 69(1):481-484, 2020.
- 3) C. Vanselow, D. Stöbener, J. Kiefer, A. Fischer: Revealing the impact of laser-induced breakdown on a gas flow. *Measurement Science and Technology* 31(2):027001 (4 pp.), 2020.
- 4) A. Fischer: Limiting uncertainty relations in laser-based measurements of position and velocity due to quantum shot noise. *Entropy* 21(3):264 (19 pp.), 2019.
(selected for the special edition "Editor's Choice Articles" in 2020 as being of special interest)
- 5) A. Fischer: Fundamental uncertainty limit for speckle displacement measurements. *Applied Optics* 56(25):7013-7019, 2017.
(highlighted article with excellent scientific quality, Editor's Pick)
- 6) A. Fischer, D. Stöbener: In-process roughness quality inspection for metal sheet rolling. *CIRP Annals - Manufacturing Technology* 68(1):523-526, 2019.
- 7) M. Mikulewitsch, A. von Freyberg, A. Fischer: Confocal fluorescence microscopy for geometry parameter measurements of submerged micro-structures. *Optics Letters* 44(5):1237-1240, 2019.
- 8) C. Dollinger, M. Sorg, N. Balaresque, A. Fischer: Measurement uncertainty of IR thermographic flow visualization measurements for transition detection on wind turbines in operation. *Exp. Thermal and Fluid Science* 97:279-289, 2018.
- 9) A. Fischer: Imaging flow velocimetry with laser Mie scattering. *Applied Sciences* 7(12):1298 (31 pp.), 2017.
Invited review article.
- 10) R. Kuschmierz, A. Davids, S. Metschke, F. Löffler, H. Bosse, J. Czarske, A. Fischer: Optical, in-situ, three dimensional, absolute shape measurements in CNC metal working lathes. *International Journal for Advances Manufacturing Technology* 84(9):2739-2749, 2016.