

Dr. Markus Osterhoff

Personal Details

Date of Birth	30 th June 1983
Place of Birth	Warstein, Germany
Nationality	German
Family status	Married



Work Experience & Education

since 6/2016	Staff Scientist Institut für Röntgenphysik
7/2019-6/2023	PI: Neurotomo , BMBF project 05K19MG2
2016-2019	PI: Nanosolar , BMBF project 05K16MGA / Röntgen-Ångström-Cluster
7/2015-6/2019	PI: SFB 755 , Projects C12, INF
2012-2016	PostDoc , Institut für Röntgenphysik
2011	Ph.D. Thesis (Dr. rer. nat.) Georg-August-Universität Göttingen
Grade	<i>Magna cum laude</i>
Title	Wave optical simulations for x-ray nano focusing optics
Supervisors	Prof. Dr. Tim Salditt, Dr. Christian Morawe (ESRF, Grenoble, France)
2009-2011	Ph.D. position: ESRF, Grenoble
2007-2008	Diploma Thesis Georg-August-Universität Göttingen
Title	<i>Numerische Modellierungen von Röntgenwellenleitern unter Berücksichtigung von Realstruktureffekten</i>
Supervisor	Prof. Dr. Tim Salditt
Grade	<i>sehr gut</i> - very good
since 2007	PC and Network Administrator Institut für Röntgenphysik
2004-2008	Studies: Diplom-Physik Georg-August-Universität Göttingen Vordiplom in physics, October 2006; Grade: 2.0
2000-2009	Free Journalist Sports and spot reporter for several newspapers Westfälische Rundschau, Westfälischer Anzeiger, Göttinger Wochenzeitung, and more
1994-2003	Abitur Städtisches Gymnasium Warstein

Teaching Experience (Excerpt)

2018/2019	Oberassistentz: Experimentalphysik I Prof. Dr. Sarah Köster
2015/2016	Prof. Dr. Sarah Köster
	Oberassistentz: Experimentalphysik II
2017	Prof. Dr. Tim Salditt
2015	Prof. Dr. Tim Salditt
2013	Prof. Laura Covi, PhD; Prof. Dr. Sarah Köster
	Oberassistentz: Experimentalphysik III
2021/2022	Prof. Dr. Tim Salditt
	Assistenz: Modern Experimental Methods
since 2020	Prof. Dr. Tim Salditt
	Assistenz: Introduction to Biophysics
2020/2021	Prof. Dr. Sarah Köster
2019/2020	Prof. Dr. Sarah Köster
2017/2018	Prof. Dr. Sarah Köster
	Workshop: Analysis methods in X-ray tomography
2020	Prof. Dr. Tim Salditt
	Assistenz: Applications of Synchrotron Radiation; Exkursion zum DESY
since 2014	Prof. Dr. Simone Techert
	Lab Courses (e.g. PPP); Practical Courses at the Beamline
on request	Prof. Dr. Tim Salditt, Prof. Dr. Simone Techert
	Lecture stand-in: Experimentalphysik III (2-Fach-Bachelor)
2013/2014	Prof. Dr. Tim Salditt
	Assistenz: Grundlagen des Experimentierens
2013	Prof. Dr. Tim Salditt
2012	Prof. Dr. Tim Salditt
	Assistenz: Moderne Optik
2012	Prof. Dr. Tim Salditt, Prof. Dr. Claus Ropers
since 2012	Institutsseminar / diverse thematische Seminare Prof. Dr. Tim Salditt
	Assistenz: Biomedizinische Bildgebung und Medizinphysik
2010/2011	Prof. Dr. Tim Salditt, PD Dr. Timo Aspelmeier

Publications

2021

- Nature Communications, 12, 3468
- Pump-probe X-ray holographic imaging of laser-induced cavitation bubbles with femtosecond FEL pulses**
M. Vassholz, H.P. Hoeppe, J. Hagemann, J.M. Rosselló, M. Osterhoff, R. Mettin, T. Kurz, A. Schropp, F. Seiboth, C.G. Schroer, M. Scholz, J. Möller, J. Hallmann, U. Boesenberg, C. Kim, A. Zozulya, W. Lu, R. Shayduk, R. Schaffer, A. Madsen, T. Salditt
- J. Synchrotron Rad. 28, 987-994
- Nanosecond timing and synchronization scheme for holographic pump-probe studies at the MID instrument at European XFEL**
M. Osterhoff, M. Vassholz, H.P. Hoeppe, J.M. Rosselló, R. Mettin, J. Hagemann, J. Möller, J. Hallmann, M. Scholz, R. Schaffer, U. Boesenberg, C. Kim, A. Zozulya, W. Lu, R. Shayduk, A. Madsen, T. Salditt
- J. Synchrotron Rad. 28, 52-63
- Single-pulse phase-contrast imaging at free-electron lasers in the hard X-ray regime**
J. Hagemann, M. Vassholz, H. Hoeppe, M. Osterhoff, J.M. Rosselló, R. Mettin, F. Seiboth, A. Schropp, J. Möller, J. Hallmann, C. Kim, M. Scholz, U. Boesenberg, R. Schaffer, A. Zozulya, W. Lu, R. Shayduk, A. Madsen, C.G. Schroer, T. Salditt
- J. Synchrotron Rad. 28, 1573-1582
- Off-axis multilayer zone plate with 16nm × 28nm focus for high-resolution X-ray beam induced current imaging**
J. Soltau, L. Chayanun, M. Lyubomirskiy, J. Wallentin, M. Osterhoff
- Optica 8, 818-823
- In-line holography with hard x-rays at sub-15 nm resolution**
J. Soltau, M. Vassholz, M. Osterhoff, T. Salditt
- Optics Express (accepted)
- Finite-difference propagation for simulation of x-ray multilayer optics**
J. Soltau, L.M. Lohse, M. Osterhoff, T. Salditt
- J. Synchrotron Rad. 28, 518-529
- Combined Scanning Small Angle X-Ray Scattering and Holography Probes Multiple Length Scales in Cell Nuclei**
A. Wittmeier, C. Cassini, M. Töpperwien, M. Denz, J. Hagemann, M. Osterhoff, T. Salditt, S. Köster
- 2020**
- eLife 9:e60408
- 3d Virtual Patho-Histology of Lung Tissue from Covid-19 Patients based on Phase Contrast X-ray Tomography**
M. Eckermann, J. Frohn, M. Reichardt, M. Osterhoff, M. Sprung, F. Westermeier, A. Tzankov, C. Werlein, M. Kuehnel, D. Jonigk, T. Salditt
- J. Synchrotron Rad. 27, 1707-1719
- 3D virtual histology of human pancreatic tissue by multiscale phase-contrast X-ray tomography**
J. Frohn, D. Pinkert-Leetsch, J. Missbach-Güntner, M. Reichardt, M. Osterhoff, F. Alves, T. Salditt
- 2019**
- J. Synchrotron Rad. 26, 1173-1180
- Focus characterization of the NanoMAX Kirkpatrick-Baez mirror system**
M. Osterhoff, A.L. Robisch, J. Soltau, M. Eckermann, S. Kalbfleisch, D. Carbone, U. Johansson, T. Salditt

Publications (Continued)

- J. Synchrotron Rad.
26, 1144-1151
A beamline-compatible STED microscope for combined visible-light and X-ray studies of biological matter
M. Bernhardt, J.D. Nicolas, M. Osterhoff, H. Mittelstädt, M. Reuss, B. Harke, A. Wittmeier, M. Sprung, S. Köster, T. Salditt
- AIP Conf. Proc.
2954, 1, 060075
STXM analysis: Preparing to go live @ 750 Hz
M. Osterhoff, J. Goeman, T. Salditt, S. Köster
- 2018**
Nature
Communications
9, 3641
Correlative microscopy approach for biology using x-ray holography, x-ray scanning diffraction, and STED nanoscopy
M. Bernhardt, J.D. Nicolas, M. Osterhoff, H. Mittelstädt, M. Reuss, B. Harke, A. Wittmeier, M. Sprung, S. Köster, T. Salditt
- 2017**
J. Synchrotron Rad.
24, 498-505
Probe Reconstruction for Holographic X-ray Imaging
J. Hagemann, A.L. Robisch, M. Osterhoff, T. Salditt
- Nano Letters
17, 4143-4150
Bending and Twisting Lattice Tilt in Strained Core-Shell Nanowires Revealed by Nanofocused X-ray Diffraction
J. Wallentin, D. Jacobsson, M. Osterhoff, M.T. Borgström, T. Salditt
- X-Ray Spectrometry
46, 107-115
X-ray waveguide arrays: tailored near fields by multi-beam interference
Q. Zhong, M. Osterhoff, M.W. Wen, Z.S. Wang, T. Salditt
- Proc SPIE 10389
10.1117/12.2271140
Simulations and experiments on vibration damping for zoom-holography and nano-scanning at the GINIX
M. Osterhoff, P. Luley, M. Sprung, T. Salditt
- Proc SPIE 10389
10.1117/12.2271141
Faster scanning and higher resolution: new setup for multilayer zone plate imaging
M. Osterhoff, J. Soltau, C Eberl, H.U. Krebs
- Proc SPIE 10386
10.1117/12.2271139
Ultra-high-aspect multilayer zone plates for even higher x-ray energies
M. Osterhoff, J. Soltau, C Eberl, H.U. Krebs
- Proc SPIE 10388
10.1117/12.2275535
Aberrations in compound refractive len systems: analytical and numerical calculations
M. Osterhoff, C. Detlefs, C. Ferrero
- J Phys: Conf Series
849, 01259
dada -a web-based 2D detector analysis tool
M. Osterhoff
- J Phys: Conf Series
849, 012049
Preparing for hard x-ray microscopy with Multilayer Zone Plates
M. Osterhoff, C. Eberl, J. Soltau, H.U. Krebs
- 2016**
Talanta
161, 368-376
Combined in-situ imaging of structural organization and elemental composition of substantia nigra neurons in the elderly
A.D. Surowka, M. Töpperwien, M. Bernhardt, J.D. Nicolas, M. Osterhoff, T. Salditt, D. Adamek, M. Szczerbowska-Boruchowska

Publications (Continued)

- Biophys J.
110, 680–690
- X-Ray Micro- and Nanodiffraction Imaging on Human Mesenchymal Stem Cells and Differentiated Cells**
M. Bernhardt, M. Priebe, M. Osterhoff, C. Wollnik, A. Diaz, T. Salditt, F. Rehfeldt
- Adv. Mater.
28, 1788–1792
- In Operando X-Ray Nanodiffraction Reveals Electrically Induced Bending and Lattice Contraction in a Single Nanowire Device**
J. Wallentin, M. Osterhoff, T. Salditt
- 2015**
- Nature Materials
14, 691–695
- Grain rotation and lattice deformation during photoinduced chemical reactions revealed by in situ X-ray nanodiffraction**
Z. Huang, M. Bartels, R. Xu, M. Osterhoff, S. Kalbfleisch, M. Sprung, A. Suzuki, Y. Takahashi, T.N. Blanton, T. Salditt, J. Miao
- Phys. Rev. Lett.
115, 203902
- X-Ray Optics on a Chip: Guiding X Rays in Curved Channels**
T. Salditt, S. Hoffmann, M. Vassholz, J. Haber, M. Osterhoff, J. Hilhorst
- J. Appl. Cryst.
48, 116–124
(cover)
- Towards multi-order hard X-ray imaging with multilayer zone plates**
M. Osterhoff, C. Eberl, F. Döring, R.N. Wilke, J. Wallentin, H.U. Krebs, M. Sprung, T. Salditt
- J. Synchrotron Rad.
22, 867–878
- Compound focusing mirror and X-ray waveguide optics for coherent imaging and nano-diffraction**
T. Salditt, M. Osterhoff, M. Krenkel, R.N. Wilke, M. Priebe, M. Bartels, S. Kalbfleisch, M. Sprung
- J. Appl. Cryst.
48, 116–124
- Towards multi-order hard X-ray imaging with multilayer zone plates**
M. Osterhoff, C. Eberl, F. Döring, R.N. Wilke, J. Wallentin, H.U. Krebs, M. Sprung, T. Salditt
- Proc SPIE 9588
- MZP design and fabrication for efficient hard x-ray nano-focusing and imaging**
C. Eberl, M. Osterhoff, F. Döring, H.U. Krebs
- Proc SPIE 9592
- Progress on multi-order hard x-ray imaging with multilayer zone plates**
M. Osterhoff, F. Döring, C. Eberl, R. Wilke, J. Wallentin, H.U. Krebs, M. Sprung, T. Salditt
- J. Appl. Cryst.
48, 1
- Simultaneous high-resolution scanning Bragg contrast and ptychographic imaging of a single solar cell nanowire**
J. Wallentin, R.N. Wilke, M. Osterhoff, T. Salditt
- 2014**
- Nano Letters
14, 7071–6
- Hard X-ray Detection Using a Single 100 nm Diameter Nanowire**
J. Wallentin, M. Osterhoff, R.N. Wilke, K.M. Persson, L.E. Wernersson, M. Sprung, T. Salditt
- Phys. Rev. Lett.
113, 118102
- Collective Lipid Bilayer Dynamics Excited by Surface Acoustic Waves**
T. Reusch, F.J.R. Schülein, J.D. Nicolas, M. Osterhoff, A. Beerlink, H.J. Krenner, M. Müller, A. Wixforth, T. Salditt

Publications (Continued)

- Appl. Surf. Sci.
307, 638–644
Fabrication of laser deposited high-quality multilayer zone plates for hard x-ray nanofocusing
C. Eberl, F. Döring, T. Liese, F. Schlenkrich, B. Roos, M. Hahn, T. Hoinkes, A. Rauschenbeutel, M. Osterhoff, T. Salditt, H.U. Krebs
- J. Appl. Cryst.
47, 1596–1605
Time-resolved coherent X-ray diffraction imaging of surface acoustic waves
J.D. Nicolas, T. Reusch, M. Osterhoff, M. Sprung, F.J.R. Schülein, H.J. Krenner, A. Wixforth, T. Salditt
- J. Synchrotron Rad.
21, 708–715
Pulse-resolved multi-photon X-ray detection at 31 MHz based on a quadrant avalanche photodiode
T. Reusch, M. Osterhoff, J. Agricola, T. Salditt
- J. Synchrotron Rad.
21,
High-dynamic-range coherent diffractive imaging: ptychography using the mixed-mode pixel array detector
K. Giewekemeyer, H.T. Philipp, R.N. Wilke, A. Aquila, M. Osterhoff, M.W. Tate, K.S. Shanks, A.V. Zozulya, T. Salditt, S.M. Gruner, A.P. Mancuso
- Acta. Cryst.
A70, 552–562
High Flux Ptychographic Imaging using the new 55 μ m-pixel detector “Lambda” based on the Medipix3 readout chip
R.N. Wilke, J. Wallentin, M. Osterhoff, D. Pennicard, A. Zozulya, M. Sprung, T. Salditt
- J. Appl. Cryst.
47, 1596–1605
Time-resolved coherent X-ray diffraction imaging of surface acoustic waves
J.D. Nicolas, T. Reusch, M. Osterhoff, M. Sprung, F.J.R. Schülein, H.J. Krenner, A. Wixforth and T. Salditt
- J. Synchrotron Rad.
21, 708–715
Pulse-resolved multi-photon X-ray detection at 31 MHz based on a quadrant avalanche photodiode
T. Reusch, M. Osterhoff, J. Agricola, T. Salditt
- 2013**
Phys. Rev. Lett.
111, 268101
Nonequilibrium Collective Dynamics in Photoexcited Lipid Multilayers by Time Resolved Diffuse X-Ray Scattering
T. Reusch, D.D. Mai, M. Osterhoff, D. Khakhulin, M. Wulff, T. Salditt
- Optics Express
21, 19311–23
Sub-5 nm hard x-ray point focusing by a combined Kirkpatrick-Baez mirror and multilayer zone plate
F. Döring, A.L. Robisch, C. Eberl, M. Osterhoff, A. Ruhlandt, T. Liese, F. Schlenkrich, S. Hoffmann, M. Bartels, T. Salditt, H.U. Krebs
- Optics Letters
38, 5126–9
Optimized x-ray multilayer mirrors for single nanometer focusing
M. Osterhoff, J.P. Guigay, C. Ferrero, C. Morawe
- J. Synchrotron Rad.
20, 490–497
Versatility of a hard X-ray Kirkpatrick-Baez focus characterized by ptychography
K. Giewekemeyer, R.N. Wilke, M. Osterhoff, M. Bartels, S. Kalbfleisch, T. Salditt

Publications (Continued)

- Optics Express
21, 13005-13017
- Single pulse coherence measurements in the water window at the free-electron laser FLASH**
D.D. Mai, J. Hallmann, T. Reusch, M. Osterhoff, S. Düsterer, R. Treusch, A. Singer, M. Beckers, T. Gorniak, T. Senkbeil, R. Dronyak, J. Gulden, O.M. Yefanov, A. Al-Shemmary, A. Rosenhahn, A.P. Mancuso, I.A. Vartanyants, T. Salditt
- AIP Advances
3, 072127
- Standing surface acoustic waves in LiNbO₃ studied by time resolved X-ray diffraction at Petra III**
T. Reusch, F. Schülein, C. Bömer, M. Osterhoff, A. Beerlink, H.J. Krenner, A. Wixforth, T. Salditt
- Journal of Physics
Conference S. 425
- Progress at the ESRF multilayer facility**
Ch. Morawe, J. Ch. Peffen, K. Friedrich, M. Osterhoff
- Journal of Physics
Conference S. 425
- A wave-optical toolbox for multiple CRL transfocators**
M. Osterhoff, D. Karkoulis, and C. Ferrero
- Proc SPIE 8848
- Two-dimensional sub-5 nm hard x-ray focusing with MZP**
M. Osterhoff, M. Bartels, F. Döring, C. Eberl, T. Hoinkes, S. Hoffmann, T. Liese, V. Radisch, A. Rauschenbeutel, A.L. Robisch, A. Ruhlandt, F. Schlenkrich, T. Salditt, H.U. Krebs
- 2012**
- Opt. Lett. 37, 3705-7
- Wave-optical theory of nano-focusing x-ray multilayer mirrors**
M. Osterhoff, C. Morawe, C. Ferrero, J.P. Guigay
- AIP Advances
2, 012175
- A combined Kirkpatrick-Baez mirror and multilayer lens for sub-10 nm x-ray focusing**
A. Ruhlandt, T. Liese, V. Radisch, S.P. Krüger, M. Osterhoff, K. Giewekemeyer, H.U. Krebs, T. Salditt
- 2011**
- New J. of Physics
13, 103026
- Coherence filtering of x-ray waveguides: analytical and numerical approach**
M. Osterhoff, T. Salditt
- Optics Express
19, 9656-9675
- Partially coherent nano-focused x-ray radiation characterized by Talbot interferometry**
T. Salditt, S. Kalbfleisch, M. Osterhoff, S.P. Krüger, M. Bartels, K. Giewekemeyer, H. Neubauer, M. Sprung
- AIP Conf. Proc.
1365, 96-99
- The Göttingen Holography Endstation of Beamline P10 at PETRA III/DESY**
S. Kalbfleisch, H. Neubauer, S.P. Krüger, M. Bartels, M. Osterhoff, D.D. Mai, K. Giewekemeyer, B. Hartmann, M. Sprung, T. Salditt
- Proc SPIE 8141
- Partially coherent x-ray beam simulations: mirrors and more**
M. Osterhoff, T. Salditt
- 2010**
- AIP Conf. Proc.
1234, 433-436
- The holography endstation of beamline P10 at PETRA III**
S. Kalbfleisch, M. Osterhoff, K. Giewekemeyer, H. Neubauer, S.P. Krüger, B. Hartmann, M. Bartels, M. Sprung, O. Leupold, F. Siewert, T. Salditt

Publications (Continued)

NIMA 616 **Curved graded multilayers for X-ray nano-focusing optics**
C. Morawe, M. Osterhoff

XROI **Hard X-Ray Focusing with Curved Reflective Multilayers**
C. Morawe, M. Osterhoff

2009
Optics Commun. 282, 3250-6 **Real structure effects in x-ray waveguide optics:
the influence of interfacial roughness and index profile
on the near-field and far-field distribution**
M. Osterhoff, T. Salditt

Researcher ID F-7967-2015

ORCID 0000-0002-7865-515X

GRO-ID rp02128
<https://publications.goettingen-research-online.de/cris/rp/rp02128>

Funded Projects

10/2021-9/2026	NFDI: Daphne development of electronic lab books ∑ 332 893.40 € (together with Sarah Köster, within consortium)
2021	CIDAS: snip development of electronic lab books ∑ 27 200,00 € (together with Christoph Lehrenfeld)
7/2019-6/2023	BMBF: Neurotomo , project 05K19MG2, ∑ 471 679.37 € (together with Tim Salditt)
2016-2019	BMBF: Nanosolar , project 05K16MGA / Röntgen-Ångström-Cluster, ∑ 435 257.70 € (together with Tim Salditt)
7/2015-6/2019	DFG: SFB 755 , Projects C12, INF ∑ 473 700,00 € (together with Hans-Ulrich Krebs, C12) ∑ 130 900,00 € (together with Ramin Yahyapour, INF)

Granted Synchrotron Beamtimes

9/2017	DESY (P10): I-2017 0130 (together with Jesper Wallentin)
9/2017	DESY (P10): I-2017 0448 (together with Simone Techert)
12/2016	DESY (P10): I-2016 0062 (together with Hans-Ulrich Krebs)
9/2016	ESRF (ID31): MI-1260 (together with Hans-Ulrich Krebs)

Awards

2018	Dectris Award for Innovative Researchers for the design, commissioning, and programming of the "Heinzelmännchen cluster" for real-time data analysis
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Reviewer

since 2021	Proposal Advisory Committee: NanoMAX beamline @ MAX IV, Lund
since 2020	Scientific Reports Numerical Instruments and Methods in Physics Research A
since 2019	Applied Physics Letters Sensors Actuators
since 2016	Optics Express
since 2014	Optics Communications
since 2013	Optics Letters

Selected Talks

- 6/2018
Taipeh
Conference: Synchrotron Radiation Instrumentation
STXM analysis: Preparing to go live @ 750 Hz
- 2/2018
Hamburg
KFS: Digitale Agende
Nutzerperspektive aus Göttingen
- 6/2017
Hamburg
RAC Perspective Workshop
Göttingen Instrument for Nano-Imaging with X-rays
- 5/2017
ESRF Grenoble
Hercules Summer School
X-Ray Optics for Imaging
- 10/2016
Göttingen
Symposium on the occasion of Günter Schmahl's 80th birthday
Hard X-Ray MZP-Imaging at GINIX
- 8/2015
SPIE
San Diego
Conference: Optics + Photonics
Progress on multi-order hard x-ray imaging
with multilayer zone plates
- 10/2014
Melbourne
Conference: X-Ray Microscopy
(Towards) Multi-Order Hard X-Ray Imaging with Multilayer Zone Plates
- 2/2014
Osaka
Workshop: Atomically Controlled Fabrication Technology
X-Ray Imaging with Nanobeams
- 2/2012
ESRF
Grenoble
Three-Way Meeting (ESRF, APS, SPring-8)
Wave-optical simulations
of focusing multilayer mirrors
- 9/2011
SPIE
San Diego
Conference: Optics + Photonics
Partially coherent x-ray beam simulations:
mirrors and more
- 2/2010
Big Sky, Montana
Conference: PXRMS
Waveoptical Investigations of X-Ray-Mirrors
with Special Regard to Figure Errors and Roughness

Attended Courses

12/2019	Diversitätsreflektierende Lehre Hochschuldidaktik Uni Göttingen
10/2018	E-Assessment: Aus der Praxis für die Praxis Uni Göttingen
11/2016	Umgang mit schwierigen Situationen in der Lehre Hochschuldidaktik Uni Göttingen
5/2016	InDesign-Kurs GWDG, Göttingen
5/2015	Leadership Excellence in the Knowledge Society SFB 755, Göttingen
10/2010	Convincing Scientific Presentations Euroforum: EMBL, Heidelberg
3/2010	Presentation Skills ESRF, Grenoble
8/2009	CERN School of Computing CERN, Genève

Language Skills

German	mother tongue
English	fluent
French	basic

Computer Skills

Programming	C, Assembly	MPI, CUDA	SSE/AVX
Scientific	Mathematica		
Analysis	Gnuplot, dada (data daemon @ Heinzelmännchen), etc.		
Linux	Vim, gdb, valgrind	data analysis	kernel programming
Data	git, ZFS, NeXuS/HDF5	data storage	data retrieval
Instrumentation	GINIX: control software; JUst a Picture Pump, JUst a Data brIDge		

Special Interests

Photography	https://sci.photos
Music	Piano, Organ
Computing	Gentoo Linux, ATmega microcontroller