

# Remote Sensing Technology Institute

## Institut für Methodik der Fernerkundung

Scientific Record 2018 – 2019



This living document reports the current status of IMF's and TUM-LMF/SiPEO's scientific activities and achievements starting from 2018. Sort criteria and template follow the structure of DLR institute reports.

# Scientific Record 2018 – 2019 (25.3.2020)

This Documentation chapter covers scientific activities of IMF and TUM-LMF/-SiPEO staff in the time period between January 2018 and 2019.

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## Teaching and Education

### Lectures at Technical University of Munich (TUM)

University courses conducted by IMF/LMF/SIPEO staff from 2018 until 2019 (lecturers of TUM-LMF/SIPEO in *italic typeface*).  
Winter semester courses are listed in the year of beginning.

University	Title	Lecturers	2018	2019	2020	2021	2022	2023
TUM	Photogrammetrie und Fernerkundung IV (Vorlesung + Übung)	<i>Körner, M.</i> <i>Auer, S.</i> <i>Schmitt, M.</i> <i>Eineder, M.</i>	■	■				
TUM	Satellitenfernerkundung (Vorlesung + Übung)	<i>Körner, M.</i> <i>Auer, S.</i> <i>Schmitt, M.</i> <i>Eineder, M.</i>	■	■				
TUM	Systems Theory and Signal Processing (Lecture + Tutorial)	Bamler, R. Zhu, X.	■	■				
TUM	Systemtheorie u. Signalverarbeitung (Vorlesung + Übung)	Bamler, R. Zhu, X.	■	■				
TUM	Introduction into Microwave and SAR Remote Sensing	Eineder, M.	■	■				
TUM	Estimation Theory (Lecture + Tutorial)	Bamler, R. Kurz, F. Zhu, X.	■	■				
TUM	Schätztheorie (Vorlesung + Übung)	Bamler, R. Kurz, F. Zhu, X.	■	■				
TUM	Remote Sensing – Advanced Methods	Eineder, M. Trautmann, T. Zhu, X. <i>Schmitt, M.</i>	■	■				
TUM	Fernerkundung und Signalverarbeitung	Eineder, M. Trautmann, T. Zhu, X. <i>Schmitt, M.</i>	■	■				
TUM	Seminar Remote Sensing	Zhu, X.	■	■				
TUM	Bildverstehen Grundlagen – Übung	<i>Körner, M.</i> <i>Koch, T.</i>	■					
TUM	Bildverstehen – Vertiefte Methoden	<i>Körner, M.</i> <i>Liebel, L.</i>	■	■				

University	Title	Lecturers	2018	2019	2020	2021	2022	2023
TUM	Bildverstehen – Aktuelle Ansätze des Maschinellen Lernens	<i>Körner, M. Liebel, L.</i>	■	■				
TUM	Electrodynamics	Efremenko, D.	■	■				
TUM	Nonlinear Optimisation	Efremenko, D.	■	■				
TUM	Multisensor-Datenfusion	<i>Schmitt, M.</i>	■	■				

**Lectures at other Universities**

University courses conducted by IMF staff from 2018 until 2019.  
Winter semester courses are listed in the year of beginning.

University	Title	Lecturers	2018	2019	2020	2021	2022	2023
Jena	SAR-Signalverarbeitung (SAR-EDU)	Auer, S. Eineder, M. Lehner, S. Pleskachevsky, A.	■	■				
Alcala, SP	Hyperspectral Remote Sensing	Cerra, D.	■					
Osnabrück	Methoden digitaler Bildverarbeitung	Cerra, D.	■					
Osnabrück	Praxis Methoden Digitaler Bildverarbeitung	Cerra, D.	■					
Bukarest, RO (Politehnica)	Principles of Remote Sensing	Datcu, M.	■					
Bukarest, RO (Politehnica)	Stochastic Proceses for Computer Vision	Datcu, M.	■					
Bukarest, RO (Politehnica)	Computer Vision and AI	Datcu, M.		■				
Paris, FR (CNAM, Sorbonne, CentraleSupélec, ONERA, ESIEE)	Lecture series in the frame of the "Chaire d'excellence internationale Blaise Pascal" on EO Data Science	Datcu, M.	■	■				
Augsburg	Applied Remote Sensing	Fischer, P. Langheinrich, M.	■					
München (HS)	Messtechnik II	Haschberger, P.	■	■				
Thessaloniki, GR	Satellite Remote Sensing	Loyola, D.	■	■				
Osnabrück	Fernerkundliche Umweltanalyse	Reinartz, P.	■	■				
Hannover	Operationelle Fernerkundung	Storch, T.	■	■				
Hannover	Big Geospatial Data	Werner, M.	■					

CNAM: Conservatoire National des Arts et Métiers  
ESIEE: École Supérieure d'Ingénieurs en Électrotechnique et Électronique  
HS: Hochschule  
LMU: Ludwig-Maximilians-Universität  
ONERA: Office National d'Etudes et de Recherches Aéronautiques

**Non University Courses and Tutorials**

Non university courses and tutorials conducted by IMF staff between 2018 and 2019 (Courses of the LMF/SiPEO in *italic typeface*)

<b>Lecturer</b>	<b>Location</b>	<b>Subject</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>
Bamler, R.	EUSAR	SAR Interferometry and Tomography	■					
Bamler, R.	CCG	SAR Interferometry	■					
Cerra, D.	CCG/ESA	Hyperspectral Remote Sensing	■	■				
Datcu, M.	CAST	Artificial Intelligence for EO	■					
Datcu, M.	DLP GRSS, IN	Artificial Intelligence for EO		■				
Datcu, M.	ICIP	Big Data Analytics for EO	■					
Datcu, M.	IET Intern. Radar Conference	Big SAR Data Science	■					
Datcu, M.	BIT	EO Data Intelligence	■					
Datcu, M.	IGARSS	EO Big Data Intelligence	■	■				
Datcu, M.	Workshop on Quantum Computing, Köln	Quantum Machine Learning	■					
Datcu, M.	Romanian Academy, RO	Space Technology: The Change of Paradigm		■				
De Zan, F.	TUM Int.	SAR Interferometry and Tandem-L		■				
Eineder, M.	TUM Int.	SAR Introduction	■	■				
Eineder, M.	CCG	SAR Remote Sensing	■	■				
Eineder, M.	CCG/ESA	Microwave Remote Sensing	■	■				
Fritz, T.	TUM Int.	TerraSAR-X & TanDEM-X		■				
Gege, P.	CeNAT	WASI Training	■	■				
Gomba, G.	TUM Int.	Ionospheric Effects in SAR		■				
Hamidouche, M.	CCG	Infrared Astronomy: Unveiling the Hidden Universe	■	■				
Haschberger, P.	CCG	Spektrometer und Kalibrierung	■	■				
Jacobsen, S.	TUM Int.	SAR Oceanography		■				

Lecturer	Location	Subject	2018	2019	2020	2021	2022	2023
Körner, M.	KIT	Deep Learning with Feed-Forward & Recurrent Models		■				
Krauß, T.	CCG	Fernerkundung aus dem Weltraum mit multispektralen, hyperspektralen und Stereoaufnahmen	■	■				
Lehner, S.	EUSAR	Operational Remote Sensing by Exploiting Space-Based SAR Data	■					
Lehner, S.	CCG	SAR Oceanography	■					
Lichtenberg, G.	CCG/ESA	Atmospheric Remote Sensing, Radiative Transfer, Neutral Atmosphere	■					
Schmitt, M.	TUM Int.	Data Fusion in Remote Sensing		■				
Schreier, F.	CCG	Atmosphärische Fernerkundung – Strahlungstransportmodelle und Inversionsverfahren	■	■				
Trautmann, T.	CCG/ESA	Space-Borne Remote Sensing – Atmosphere		■				
Zhu, X.	EUSAR	Deep Learning in Remote Sensing	■					
Zhu, X.	WHISPERS	Deep Learning in Remote Sensing	■					
Zhu, X.	Uni Fairbanks, Alaska/USA	Deep learning in Remote Sensing		■				
Zhu, X.	TUM Int.	AI for Earth Observation		■				
Zhu, X.	TUM Int.	Advanced InSAR		■				

BIT: Beijing Institute of Technology  
 CAST: China Academy of Space Technology  
 CCG: Carl-Cranz-Gesellschaft  
 CeNAT: Centro Nacional de Alta Tecnología, Costa Rica  
 CNAM: Conservatoire National des Arts et Métiers  
 DLP GRSS: Distinguished Lecturer Program, Geoscience and Remote Sensing Society  
 ESA: European Space Agency  
 EUSAR: European Conference on Synthetic Aperture Radar  
 ICIP: International Conference on Image Processing  
 IGARSS: International Geoscience and Remote Sensing Symposium  
 ISPRS: International Society for Photogrammetry and Remote Sensing  
 KIT: Karlsruher Institut für Technologie  
 NASA GSFC: National Aeronautics and Space Administration, Goddard Space Flight Center  
 TUM Int.: TUM International GmbH  
 WHISPERS: Workshop on Hyperspectral Image and Signal Processing



**Internal Seminar Series**

Title	Comments
IMF Seminar	10 – 15 presentations per year, IMF and guest scientists
Seminars of IMF sections	seminars of IMF-ATP: 15 – 20 and IMF-SAR/IMF-DAS: 5 – 10 presentations per year, IMF and guest scientists
IMF Doktorandentage	annual event, 15 – 20 PhD status presentations
Doktorandenseminar TUM (LMF, SIPEO)	approx. 15 presentations per year, PhD presentations and reading sessions
TUM/DLR Summer School	annual 3 days event, 50 PhD and scientists, guest lecturers
Various Summer Schools	HGF Alliances, Munich Aerospace, SAR Education Initiative

## Academic Degrees

### Professorship Appointments

Professorship appointments of IMF or TUM-LMF/SiPEO (in *italic* typeface) staff between 2018 and 2019.

Name	Professorship	University	Year
Cerra, D.	Visiting Professor	Osnabrück	2018
Loyola, D.	Visiting Professor	Thessaloniki/Greece (Aristotle University)	2018

### Habilitations and Venia Legendi

Habilitations awarded, supervised or completed by IMF or TUM-LMF/SiPEO (in *italic* typeface) staff between 2018 and 2019.

Name	Subject	University	Year	Reviewers
<i>Körner, M.</i>	Machine Learning and Computer Vision (working title)	München (TU)	ongoing	Prof. Bamler Prof. Fraundorfer Prof. Lepetit
<i>Schmitt, M.</i>	Data Fusion for SAR and Optical Remote Sensing	München (TU)	2019	Prof. Zhu Prof. Bamler Prof. Hinz

### Doctoral Theses

Doctoral Theses completed by IMF or TUM-LMF/SiPEO (in *italic* typeface) staff between 2018 and 2019.

Name	Title	University	Year	Reviewers
<i>Bagheri, H.</i>	Fusion of TanDEM-X data and optical imagery for 3D reconstruction of urban areas	München (TU)	2019	Prof. Zhu PD Schmitt Prof. Reinartz
Bittner, K.	Building Information Extraction and Refinement from VHR Satellite Imagery using Deep Learning Techniques	Osnabrück	2019	Prof. Reinartz Prof. Fraundorfer
Gisinger, Ch.	Joint processing of SAR, GNSS and gravimetry for geophysical signals	München (TU)	2019	Prof. Pail Prof. Eineder
<i>Heublein, M.</i>	Atmospheric Tomography using GNSS and InSAR Measurements	München (TU)	2019	Prof. Hinz Prof. Zhu
Hong, D.	Regression-Induced Representation Learning and Its Optimizer: A Novel Paradigm to Revisit Hyperspectral Imagery Analysis	München (TU)	2019	Prof. Zhu Prof. Chanussot Prof. Xia

<b>Name</b>	<b>Title</b>	<b>University</b>	<b>Year</b>	<b>Reviewers</b>
<i>Kang, J.</i>	Object-based Multibaseline SAR Interferometry	München (TU)	2019	Prof. Zhu Prof. Bamler Prof. Sörgel
Kusch, G.	Efficient Large-Scale Stereo Reconstruction using Variational Methods	München (TU)	2019	Prof. Cremers Prof. Möller
Liu, S.	Satellite measurements of total and tropospheric NO <sub>2</sub>	München (TU)	2019	Prof. Doicu Prof. Bamler Prof. Wenig
Montazeri, S.	Geodetic Synthetic Aperture Radar Interferometry	München (TU)	2019	Prof. Zhu Prof. Eineder Prof. Sörgel
Partovi, T.	Levels of Generalization on Automatic Building Reconstruction from Digital Surface Models	Osnabrück	2019	Prof. Reinartz Prof. Fraundorfer
<i>Shi, Y.</i>	3D urban mapping with SAR interferometry	München (TU)	2019	Prof. Bamler Prof. Eineder Prof. Fraundorfer
Yague-Martinez, N.	Investigation of novel interferometric SAR acquisition modes to support the modelling of earthquake and volcanic processes	München (TU)	2019	Prof. Eineder Prof. Bamler Prof. Moreira
Zhuo, X.	Semantic Information Extraction from UAV Imagery and Aerial Imagery	München (TU)	2019	Prof. Bamler Prof. Reinartz Prof. Fraundorfer
Ansari, H.	Efficient High-Precision Time Series Analysis for Synthetic Aperture Radar Interferometry	München (TU)	2018	Bamler, R. Eineder, M. Hanssen, R.
<i>Baier, G.</i>	Interferometric Algorithms for Medium Resolution Sensors with Massive Coverage	München (TU)	2018	Zhu, X. Bamler, R. Reigber, A.
<i>Göritz, A.</i>	From laboratory spectroscopy to remote sensing: Methods for the retrieval of water constituents in optically complex waters	München (TU)	2018	Bamler, R. Bracher, A. Damm, A.
Merkle, N.	Geo-localization Refinement of Optical Satellite Images by Embedding Synthetic Aperture Radar Data in Novel Deep Learning Frameworks	Osnabrück	2018	Reinartz, P. Hinz, S.

**Master/Diploma/Bachelor Theses**Master (M) / Diploma (D) / Bachelor (B) theses completed at IMF or TUM-LMF/SiPEO (in *italic typeface*) between 2018 and 2019.

<b>Name</b>	<b>Subject</b>	<b>University</b>	<b>Year</b>	<b>M/D/B</b>
<i>Angermann, L.</i>	Satellitengestützte Bathymetrie zur Erstellung einer Tiefenkarte des Ismaninger Speichersees	München (TU)	2019	B
Bathmann, M.	Topographic Change Detection in the Wadden Sea Using Remote Sensing Data	Hamburg	2019	B
<i>Chen, Y.</i>	Mapping soil moisture for South Africa from Sentinel-2 data	München (TU)	2019	M
De Meester, J.	Simulation of representative nocturnal satellite imagery for urban areas with high spectral and high spatial resolution	Hannover	2019	M
Gstaiger, V.	3D Informationen aus Fernerkundungsdaten für den Bevölkerungsschutz - Nutzungsmöglichkeiten am Beispiel zweier Großveranstaltungen	Bonn	2019	M
Günzel, D.	FPGA-Prototyping eines SAR Bildprozessors zur Erkennung von Eisbergen	Bremen	2019	M
Jain, H.	Machine Learning Methods for Ozone Total Column Retrieval from Sentinel-5 Precursor Data: Application to Synthetic and Real Measurements	Berlin (TU)	2019	M
Joachim, L.	Wolkenerkennung in Satellitenaufnahmen des sichtbaren Spektralbereichs bei Nacht	Stuttgart	2019	M
<i>Meraner, A.</i>	Deep learning-based SAR-optical data fusion for cloud removal in Sentinel-2 imagery	München (TU)	2019	M
Madadikhaljan, M.	Single-Image Dehazing on Aerial Imagery Using Convolutional Neural Networks	Stuttgart	2019	M
<i>Ohlhof, J.</i>	Klassifikation von Gewässern in Sentinel-Satellitenbildern	München (TU)	2019	B
<i>Sachße, L.</i>	Prädiktion von Bildsequenzen aus Tiefendaten	München (TU)	2019	M
Stelzig, F.	Softwareimplementierung für zwei Spektrometer auf einem UAV	München (HS)	2019	B
Themann, B.	Upscaling of Field Measurements for the Validation of the Sentinel-2 Level-2A Product	Berlin (Humboldt)	2019	M
<i>Yu, W.</i>	Deep learning-based SAR image segmentation into layover, shadow and others	München (TU)	2019	M
<i>Bürgmann, T.</i>	Matching of TerraSAR-X derived ground control points to optical image elements using deep learning	München (TU)	2018	M
Fuentes Reyes, M.	Image-to-image-translation to support the interpretation of SAR imagery	München (TU)	2018	M

Name	Subject	University	Year	M/D/B
<i>Geißendörfer, O.</i>	Evaluierung von Methoden zur monokularen Tiefenschätzung aus Bildern	München (TU)	2018	B
Han, S.	Building modeling and monitoring using social media images	München (TU)	2018	M
Knöttner, J.	Trennung von parkenden und am Verkehr teilnehmenden Fahrzeugen basierend auf einer automatischen Verkehrserfassung aus Luftbildern	Würzburg-Schweinfurt (HS)	2018	B
<i>Kolsch, K.-H.</i>	Google Earth Engine: Globale Analysen basierend auf Fernerkundungsdaten	München (TU)	2018	B
Kretz, M.	Design and construction of a light source setup for stray light measurements in array spectrometers	Karlsruhe (KIT)	2018	M
<i>Li, Q.</i>	Building Footprint Generation Using Deep Learning Methods	München (TU)	2018	M
<i>Okuneva, E.</i>	Global Non-urban Local Climate Zones Classification with Sentinel-2 Images	München (TU)	2018	M
<i>Rußwurm, M.</i>	Multi-temporal land cover classification with convolutional recurrent networks	München (TU)	2018	M
<i>Sachße, L.</i>	Depth-Guided Video Frame Prediction	München (TU)	2018	M
Sheu, C.-Y.	Automatic 3D lane marking reconstruction using multi-view aerial imagery	Stuttgart	2018	M
Villamil Fajardo, S.	Synthetic retrievals of cloud parameters from DSCOVER/EPIC measurements	München (TU)	2018	M
<i>Wang, Y.</i>	Unsupervised Domain Adaptation for Image Classification	München (TU)	2018	M
Wenzl, M.	Hyperspektrale Klassifizierung des Untergrunds im Flachwasser	München (TU)	2018	M

DHBW: Duale Hochschule Baden-Württemberg  
 FH: Fachhochschule  
 FU: Freie Universität  
 HS: Hochschule  
 KIT: Karlsruher Institut für Technologie  
 LMU: Ludwig-Maximilians-Universität  
 TU: Technical University

## Scientific Exchange

### Guest Scientists

Visiting scientists ( $\geq 4$  weeks) hosted by IMF between 2018 and 2019.

Name	Period	Home Institution	Funding
Banerjee, B.	Jun 2019	IIT Bombay, India	Bavarian State Ministry for Science, Research & the Arts
Dirscherl, M.	Feb – Jun 2018	University of Island	University of Island
Dong, Y.	Feb 2019 – Jul 2020		DAAD
Eppler, J.	Jun – Sep 2018	Simon Fraser University, Canada	Simon Fraser University
Fraser, C.	Sep – Oct 2019	University of Melbourne, Australia	DAAD
Ma, L.	Mar 2019 – Sep 2020	Nanjing University, China	Alexander-von-Humboldt Foundation
Pang, L.	Oct 2018 – Aug 2019	Beijing University of Civil and Engineering Architecture, China	China Scholarship Council
Saha, S.	Mar – Jun 2019		Fondazione Bruno Kessler
Sarris, A.	Jan – Mar 2018	Foundation for Research and Technology Hellas, Greece	DAAD
Tzu-Hsin, K.	Jun – Jul 2019	Aarhus University, Denmark	Novo Nordisk Foundation
Zhang, F.	Aug 2018 – Jul 2019	Nanjing University of Information Science & Technology, Nanjing, Jiangsu, China	Alexander-von-Humboldt Foundation

**Professional Leaves**

 Periods of stay ( $\geq 4$  weeks) by IMF and TUM-LMF/SIPEO (*italic*) staff at external institutions between 2018 and 2019.

<b>Staff Member</b>	<b>Institution</b>	<b>Period</b>	<b>Funding</b>
Bittner, K.	Technische Universität Graz, Austria	Oct – Dec 2018	DAAD
Gomba, G.	Jet Propulsion Laboratory, Pasadena, USA	Oct 2018	DLR
Ge, N.	Institut d'Électronique et de Télécommunications de Rennes, France	2020	
Hong, D.	Grenoble Institute of Technology, France	Mar – Jun 2018	DLR
<i>Hu, J.</i>	University of Pavia, Italy	2020	
Hua, Y.	University of Wageningen, Netherlands	Nov – Dec 2019	DLR
<i>Hughes, L.</i>	University of Wageningen, Netherlands	Sep – Oct 2019	
<i>Kang, J.</i>	Technische Universität Graz, Austria	Aug – Sep 2018	TUM
<i>Koch, T.</i>	IPN - Computing Research Center, Mexico City, Mexico	Mar – Apr 2018	TUM
Lehner, S.	Simon Fraser University, Vancouver, Canada	Feb – Apr 2018	DLR
Liu, S.	Belgian Institute for Space Aeronomy, Brussels, Belgium	Mar 2018	DLR
Meringer, M.	Tokyo Institute of Technology, Japan	Apr – May 2018 Apr – May 2019	TIT
Mou, L.	University of Cambridge, England	Apr – May 2019	TUM
<i>Qiu, C.</i>	University of Pavia, Italy	Oct – Dec 2019	TUM
Röske, C.	NIST, USA	2020	
<i>Rußwurm, M.</i>	ESRIN PhiLab, Frascati, Italy	Jun 2018	TUM
	University of South Brittany (Vannes Institute of Technology) / Institut de Recherche en Informatique et Systèmes Aléatoires, Vannes, France Université Rennes 2, France	Nov 2018 – Feb 2019	
<i>Shi, Y.</i>	University of Cambridge, England	Apr – May 2019	TUM
Singha, S.	University of Tromsø, Norway	Apr – May 2018	DLR
Traganos, D.	University of Queensland, Brisbane, Australia	Apr – Jun 2018	DLR

## Conferences

Major conferences, colloquia and workshops (co-)organized by IMF and TUM-LMF/SiPEO between 2018 and 2019.

<b>Date</b>	<b>Event</b>	<b>Location</b>	<b>Participants</b>
23 – 24 Oct 2019	Workshop „Praktische Nutzung der Binnengewässer-Fernerkundung“	Oberpfaffenhofen	45
23 – 26 Sep 2018	WHISPERS 2018 (General Chair)	Amsterdam, NL	400



## Patents

### Filed Patent Applications

Name	Patent	Patent No	Year	Countries
Rosenbaum, D. Pypetz, M. Zumkeller, T.	Vorrichtung und Verfahren zur kontaktlosen Erfassung der Steuerwege von Luftfahrzeugen bei der Durchführung von Flugerprobungen	DE10 2019 101738.6	2019	DE
Pleskachevsky, A.	Verfahren zur Herleitung von Seestatusparametern	DE10 2018 123440.6	2018	DE, US

DE = Germany, AT = Austria, AU = Australia, BR = Brasilien, CA = Canada, CH = Switzerland, ES = Spain, EP = European Patent Organization, FR = France, GB = United Kingdom, IT = Italy, NL = The Netherlands, RU = Russia, SE = Sweden, US = USA

### Granted Patents

Name	Patent	Patent No.	Year	Countries
Duque Biarge, S. Parizzi, A. De Zan, F.	Automatic three-dimensional geolocation of SAR targets and simultaneous estimation of tropospheric propagation delays using two long-aperture SAR images	EP 3156818	2019	FR, ES, IT
Israel, M.	Verfahren zum Auffinden von Lebewesen aus der Luft sowie Flugobjekt zum Auffinden von Lebewesen aus der Luft	DE 10 2012 221580	2019	DE, CH, AT
Runge, H. Klarner, R.	Positionsbestimmung eines Fahrzeugs auf oder über einer Planetenoberfläche	EP 3049825	2019	EP, US FR, GB, IT
Runge, H. Krauß, T.	Verfahren und Vorrichtung zur Georeferenzierung von Luftbilddaten	DE 10 2016 123286	2019	DE
Klarner, R. Runge, H.	System zur Fahrerunterstützung	DE 10 2014 106890	2018	DE

For country abbreviations see footnote to previous table of Filed Patent Applications

## Awards

Awards granted to IMF and TUM-LMF/SiPEO (in *italic typeface*) staff between 2018 and 2019.

Year	Award	Laureates (only IMF, LMF/SiPEO)	Subject
2019	1 <sup>st</sup> Prize IEEE GRSS Data Fusion Contest 2019	d'Angelo, P. Cerra D. Azimi, S. Merkle, N. Tian, J. Auer, S. Pato, M. de los Reyes, R. Zhuo, X. Bittner, K. Krauss, T. Reinartz, P.	Multi-view Semantic Stereo Challenge
2019	Best Poster Award 2019, MRSS/PIA 2019 (Munich)	<i>Aigner, S.</i> <i>Kömer, M.</i>	FutureGAN: Anticipating the Future Frames of Video Sequences using Spatio-Temporal 3d Convolutions in Progressively Growing Autoencoder GANs
2019	Fall 2019 AVT Team Panel Excellence Award	Lindermeir, E.	Outstanding contributions to the NATO AVT (Applied Vehicle Technology) Program of Work
2019	Best Paper Award 2019 SPIE Journal of Applied Remote Sensing	Reinartz, P.	Deep learning decision fusion for the classification of urban remote sensing data
2019	GeodätUM Award 2019	<i>Schmitt, M.</i>	Best geodesy-related lecture at TUM Department of Civil, Geo and Environmental Engineering
2019	Best Reviewer Award, MRSS/PIA 2019 (Munich)	<i>Schmitt, M.</i>	
2019	Best Student Paper Award, JURSE 2019 (Vannes/F)	<i>Stark, T.</i> <i>Zhu, X.</i>	Slum Mapping in Imbalanced Remote Sensing Datasets Using Transfer Learned Deep Features
2019	Remote Sensing 10 <sup>th</sup> Anniversary Best Paper Award 2019	Storch, T. Müller, R.	The EnMAP Spaceborne Imaging Spectroscopy Mission for Earth Observation
2019	Outstanding Paper Award, WHISPERS 2019 (Amsterdam/NL)	Zhang, G. Cerra, D. Müller, R.	Towards the Spectral Restoration of Shadowed Areas in Hyperspectral Images based on Nonlinear Unmixing

Year	Award	Laureates (only IMF, LMF/SiPEO)	Subject
2018	2 <sup>nd</sup> Prize IEEE GRSS Data Fusion Contest 2018	Cerra, D. Pato, M. Carmona, E. Tian J. Azimi, S. Müller, R. Bittner, K. Henry, C. Vig, E. Kurz, F. Bahmanyar, R. d'Angelo, P. Alonso, K. Fischer, P. Reinartz, P.	Multimodal Land Use Classification
2018	Distinguished Lecturer for the IEEE Geoscience and Remote Sensing Society	Datcu, M.	
2018	Ad Astra Award for Excellence in Science (Romanian Researchers' Association)	Datcu, M.	
2018	Best Paper Award, ALLDATA 2018 (Athens/Greece)	Dumitru, C. Schwarz, G. Datcu, M.	Monitoring of Coastal Environments Using Data Mining
2018	2018 Richard M. Goody Award	Efremenko, D.	Atmospheric Radiation and Remote Sensing
2018	DLR-Wissenschaftspreis 2018	Fritz, T. (co-author)	Generation and performance assessment of the global TanDEM-X digital elevation model
2018	Best Reviewer Award 2017 (IEEE Geoscience and Remote Sensing Letters)	Ghamisi, P.	
2018	1 <sup>st</sup> Place Student Paper Award, EUSAR 2018 (Aachen)	Kang, J. Wang, Y. Zhu, X.	Low Rank Modeling based Multipass InSAR technique
2018	Länderpreis 2018 (Verband deutscher Vermessungsingenieure)	Knöttner, J.	Trennung von parkenden und am Verkehr teilnehmenden Fahrzeugen basierend auf einer automatischen Verkehrserfassung aus Luftbildern
2018	Outstanding Contribution to Reviewing (ISPRS TC I Midterm Symposium, Karlsruhe)	<i>Schmitt, M.</i>	
2018	Best Paper Honourable Mention (ISPRS TC I Midterm Symposium, Karlsruhe)	<i>Schmitt, M.</i> <i>Hughes, L.</i> <i>Zhu, X.</i>	The SEN1-2 Dataset for Deep Learning in SAR-Optical Data Fusion

Year	Award	Laureates (only IMF, LMF/SiPEO)	Subject
2018	Junior Fellow (TU München)	Vig, E.	
2018	PRACE Ada Lovelace Award for HPC 2018 (Partnership for Advanced Computing in Europe)	Zhu, X.	Global Urban Modeling
2018	Leopoldina Early Career Award 2018	Zhu, X.	
2018	Heinz Maier-Leibnitz-Medaille (TU München)	Zhu, X.	

# Memberships

## Memberships in Space Mission related Boards

Member	Agency	Board	2018	2019	2020	2021	2022	2023
Birk, M.	ESA	MIPAS Quality Working Group	■					
Birk, M.	ESA	TROPOMI Quality Working Group		■				
Gottwald, M.	DLR	SCIAMACHY Science Advisory Group	■					
Gottwald, M.	WMO	Polar Space Task Group	■					
Lichtenberg, G.	DLR	SCIAMACHY Science Advisory Group	■					
Loyola, D.	CEOS	Atmospheric Composition Constellation	■	■				
Loyola, D.	ESA	Sentinel 4 Mission Advisory Group	■	■				
Loyola, D.	ESA	Sentinel 5 Mission Advisory Group	■	■				
Loyola, D.	ESA	Sentinel 5 Precursor Quality Working Group	■	■				
Main-Knorn, M.	ESA	Sentinel 2 Mission Performance Center	■	■				
Pflug, B.	ESA	Sentinel 2 Mission Performance Center	■	■				
Pflug, B.	ESA	Sentinel 2 Quality Working Group	■	■				
Slijkhuis, S.	ESA/ EUMETSAT	GOME/GOME-2 Science Advisory Group	■	■				
Trautmann, T.	ESA	Sentinel 5 Precursor Mission Advisory Group	■					
Trautmann, T.	DLR	METimage Science Advisory Group	■	■				
Wagner, G.	ESA	MIPAS Quality Working Group	■					

CEOS: Committee on Earth Observation Satellites

ESA: European Space Agency

EUMETSAT: European Organisation for the Exploitation of Meteorological Satellites

HGF: Helmholtz-Gemeinschaft Deutscher Forschungszentren

JAXA: Japan Aerospace Exploration Agency

WMO: World Meteorological Organization

**Editorial Memberships**

Member	Journal / Book / Series	Publisher	2018	2019	2020	2021	2022	2023
Bamler, R.	Remote Sensing Special Issue, Guest Editor	MDPI	■					
Datcu, M.	International Journal of Image and Data Fusion	Taylor & Francis	■					
Datcu, M.	Transactions on Big Data	IEEE	■					
Datcu, M.	Remote Sensing Special Issue, Guest Editor	MDPI	■					
Datcu, M.	Geo-spatial Information Science, Guest Editor	Taylor & Francis	■					
Eineder, M.	Remote Sensing Special Issue, Guest Editor	MDPI	■					
Lehner, S.	Remote Sensing Special Issue, Guest Editor	MDPI	■					
Loyola, D.	Atmospheric Measurement Techniques	EGU	■					
Reinartz, P.	International Journal of Image and Data Fusion	Taylor & Francis	■	■				
Reinartz, P.	Remote Sensing	MDPI	■	■				
<i>Schmitt, M.</i>	Geoscience and Remote Sensing Letters	IEEE	■	■				
<i>Schmitt, M.</i>	Journal of Photogrammetry, Remote Sensing and Geoinformation Science	DGPF	■	■				
<i>Schmitt, M.</i>	Remote Sensing Special Issue, Guest Editor	MDPI		■				
Singha, S.	Remote Sensing Special Issue, Guest Editor	MDPI		■				
Slijkhuis, S.	Atmospheric Measurement Techniques	EGU	■					
Tian, J.	Remote Sensing Special Issue, Guest Editor	MDPI	■	■				
Velotto, D.	Remote Sensing Special Issue, Guest Editor	MDPI		■				
Zhu, X.	Transactions on Geoscience and Remote Sensing	IEEE	■					
Zhu, X.	Remote Sensing Special Issue, Guest Editor	MDPI	■					
Zhu, X.	Journal of Selected Topics in Applied Earth Observations and Remote Sensing, Guest Editor	IEEE	■					
Zhu, X.	Journal of Applied Remote Sensing	SPIE	■					
Zhu, X.	International Journal of Geoinformatics, Guest Editor	AgIT	■					

Member	Journal / Book / Series	Publisher	2018	2019	2020	2021	2022	2023
Zhu, X.	Computer Vision and Image Understanding, Guest Editor	Elsevier	■					

AgIT: Association for Geoinformation Technology  
 DGPf: Deutsche Gesellschaft für Photogrammetrie, Fernerkundung und Geoinformation  
 EGU: European Geosciences Union  
 IEEE: Institute of Electrical and Electronics Engineers  
 MDPI: Multidisciplinary Digital Publishing Institute  
 SPIE: International Society for Optics and Photonic

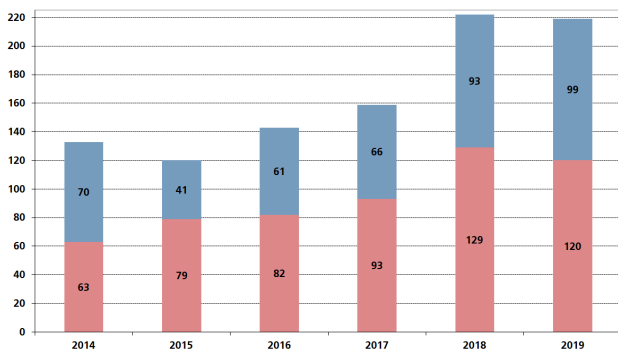
## Publications

This chapter lists in reverse chronological order for the time period between January 2018 and 2019

- publications in ISI and SCOPUS journals
- other publications with full paper review
- books and book contributions
- other publications.

Internal reports as well as doctoral, diploma, Master and Bachelor theses are not listed.

IMF authors appear in **bold** typeface, employees of the TUM-LMF/SiPEO are ***in bold and italic*** typeface.



IMF's publication activities; red: publications in ISI and SCOPUS journals; blue: other publications with full paper review (status 04.03.2020).

### Publications in ISI or Scopus Journals

2019

- [1] **Abdel Jaber, W.**, Rott, H., **Floricioiu, D.**, Wuite, J., Miranda, N.: *Heterogeneous spatial and temporal pattern of surface elevation change and mass balance of the Patagonian ice fields between 2000 and 2016*, The Cryosphere, 13, pp. 2511-2535, 2019.€132241€
- [2] **Adam, N.**: *Methodology of a Troposphere Effect Mitigation Processor for SAR Interferometry*, IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing, 12 (12), pp. 5334-5344, 2019.€134428€
- [3] Afanas'ev, V. P., Budak, V. P., **Efremenko, D. S.**, Kaplya, P. S.: *Application of the photometric theory of the radiance field in the problems of electron scattering*, Light and Engineering, 27 (2), pp. 88-96, 2019.€127039€
- [4] **Alonso, K.**, Bachmann, M., Burch, K., **Carmona, E.**, **Cerra, D.**, **de los Reyes, R.**, Dietrich, D., Heiden, U., Hölderlin, A., Ickes, J., Knodt, U., Krutz, D., Lester, H., **Müller, R.**, Pagnutti, M., **Reinartz, P.**, **Richter, R.**, Ryan, R., Sebastian, I., Tegler, M.: *Data Products, Quality and Validation of the DLR Earth Sensing Imaging Spectrometer (DEISIS)*, Sensors, 19 (20), pp. 4471-4515, 2019.€129609€
- [5] Anghel, A., Cacoveanu, R., Moldovan, A.-S., Rommen, B., **Datcu, M.**: *COBIS: Opportunistic C-Band Bistatic SAR Differential Interferometry*, IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing, 12 (10), pp. 3980-3998, 2019.€130516€
- [6] Anghel, A., Tudose, M., Cacoveanu, R., **Datcu, M.**, Nico, G., Masci, O., Dongyang, A., Weiming, T., Hu, C., Ding, Z., Nies, H., Loffeld, O., Atencia, D., Huaman, S. G., Medella, A., Moreira, J.: *Compact Ground-Based Interferometric Synthetic Aperture Radar: Short-range structural monitoring*, IEEE Signal Processing Magazine, 36 (4), pp. 42-52, 2019.€130525€
- [7] **Azimi, S.**, **Fischer, P.**, **Körner, M.**, **Reinartz, P.**: *Aerial LaneNet: Lane Marking Semantic Segmentation in Aerial Imagery using Wavelet-Enhanced Cost-sensitive Symmetric Fully Convolutional Neural Networks*, IEEE Transactions on Geoscience and Remote Sensing, 57 (5), pp. 2920-2938, 2019.€120597€
- [8] Bachofer, F., Braun, A., Adamietz, F., Murray, S., **d'Angelo, P.**, Kyazze, E., Mumuhire, A. P., Bower, J.: *Building Stock and Building Typology of Kigali, Rwanda*, Data, 4 (105), pp. 1-9, 2019.€128873€
- [9] **Bagheri, H.**, **Schmitt, M.**, **Zhu, X. X.**: *Fusion of multi-sensor-derived heights and OSM-derived building footprints for urban 3D reconstruction*, ISPRS International Journal of Geo-Information, 8 (193), pp. 1-17, 2019.€130020€
- [10] **Baumgartner, A.**: *Grating monochromator wavelength calibration using an echelle grating wavelength meter*, Optics Express, 27 (10), pp. 13596-13610, 2019.€130389€
- [11] **Birk, M.**, **Wagner, G.**, Gordon, I. E., Drouin, B. J.: *Ozone intensities in the rotational bands*, Journal of Quantitative Spectroscopy & Radiative Transfer, 226, pp. 60-65, 2019.€130295€
- [12] **Bittner, K.**, **Körner, M.**, **Fraundorfer, F.**, **Reinartz, P.**: *Multi-Task cGAN for Simultaneous Spaceborne DSM Refinement and Roof-Type Classification*, Remote Sensing, 11 (11), pp. 1262-1284, 2019.€127861€
- [13] Borsdorff, T., aan de Brugh, J., Schneider, A., Lorente, A., **Birk, M.**, **Wagner, G.**, Kivi, R., Hase, F., Feist, D. G., Sussmann, R., Rettinger, M., Wunch, D., Warneke, T., Landgraf, J.: *Improving the TROPOMI CO data product: update of the spectroscopic database and destriping of single orbits*, Atmospheric Measurement Techniques (AMT), 12 (10), pp. 5443-5455, 2019.€129635€
- [14] Bürgmann, T., Koppe, W., **Schmitt, M.**, *Matching of TerraSAR-X derived ground control points to optical image patches using deep learning*, ISPRS Journal of Photogrammetry and Remote Sensing, 158, pp. 241-248, 2019. €LMF€



- [15] Buono, A., de Macedo, C. R., Nunziata, F., **Velotto, D.**, Migliaccio, M.: *Analysis on the Effects of SAR Imaging Parameters and Environmental Conditions on the Standard Deviation of the Co-Polarized Phase Difference Measured over Sea Surface*, Remote Sensing, 11 (1), pp. 1-15, 2019.€126240€
- [16] Buono, A., Nunziata, F., de Macedo, C. R., **Velotto, D.**, Migliaccio, M.: *A sensitivity analysis of the standard deviation of the co-polarized phase difference for sea oil slick observation*, IEEE Transactions on Geoscience and Remote Sensing, 57 (4), pp. 2022 -2030, 2019.€116319€
- [17] **Chan, K. L., Wang, Z.**, Ding, A., **Heue, K.-P.**, Shen, Y., Wang, J., Zhang, F., Shi, Y., Hao, N., Wenig, M.: *MAX-DOAS measurements of tropospheric NO<sub>2</sub> and HCHO in Nanjing and a comparison to ozone monitoring instrument observations*, Atmospheric Chemistry and Physics, 19 (15), pp. 10051-10071, 2019.€129097€
- [18] Cheng, L., Tao, J., **Valks, P.**, Yu, C., **Liu, S.**, Wang, Y., Xiong, X., Wang, Z., Chen, L.: *NO<sub>2</sub> Retrieval from the Environmental Trace Gases Monitoring Instrument (EMI): Preliminary Results and Intercomparison with OMI and TROPOMI*, Remote Sensing, 11 (24), pp. 3017\_1-3017\_18, 2019.€133020€
- [19] Cleaves, H. J., Butch, C. J., Burger, P. B., Goodwin, J. T., **Meringer, M.**: *One Among Millions: The Chemical Space of Nucleic Acid-Like Molecules*, Journal of Chemical Information and Modeling, 59 (10), pp. 4266-4277, 2019.€131292€
- [20] Coca, M., Anghel, A., **Datcu, M.**: *Unbiased Seamless SAR Image Change Detection Based on Normalized Compression Distance*, IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing, 12 (7), pp. 2088-2096, 2019.€130527€
- [21] Dabboor, M., **Singha, S.**, Montpetit, B., Deschamps, B., Flett, D.: *Pre-Launch Assessment of RADARSAT Constellation Mission Medium Resolution Modes for Sea Oil Slicks and Lookalike Discrimination*, Canadian Journal of Remote Sensing, 45 (3-4), pp. 530-549, 2019.€129384€
- [22] **del Aguila, A., Efremenko, D., Molina García, V., Xu, J.**: *Analysis of Two Dimensionality Reduction Techniques for Fast Simulation of the Spectral Radiances in the Hartley-Huggins Band*, Atmosphere, 10 (3), pp. 142/1-142/15, 2019.€126849€
- [23] **del Águila, A., Efremenko, D., Trautmann, T.**: *A review of dimensionality reduction techniques for processing hyper-spectral optical signal*, Light and Engineering, 27 (3), pp. 85-98, 2019.€128817€
- [24] **Doicu, A., Efremenko, D.**: *Linearizations of the Spherical Harmonic Discrete Ordinate Method (SHDOM)*, Atmosphere, 10 (6), pp. 292-321, 2019.€127624€
- [25] **Doicu, A.**, Mishchenko, M.: *Electromagnetic scattering by discrete random media. III: The vector radiative transfer equation*, Journal of Quantitative Spectroscopy & Radiative Transfer, 236 (106564), pp. 1-25, 2019.€131979€
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- [29] **Doicu, A.**, Mishchenko, M.: *An overview of methods for deriving the radiative Transfer theory from the Maxwell equations. III: Effects of random rough boundaries and packing density*, Journal of Quantitative Spectroscopy & Radiative Transfer, 224, pp. 154-170, 2019.€125129€
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- [33] **Duque Biarge, S., Parizzi, A., De Zan, F.**: *Precise and Automatic 3-D Absolute Geolocation of Targets Using Only Two Long-Aperture SAR Acquisitions*, IEEE Transactions on Geoscience and Remote Sensing, 57 (8), pp. 5395-5406, 2019.€126961€
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- [36] Eremin, Y., **Doicu, A.**, Wriedt, T.: *Extension of the discrete sources method to investigate the non-local effect influence on non-spherical core-shell particles*, Journal of Quantitative Spectroscopy & Radiative Transfer, 235, pp. 300-308, 2019.€132227€
- [37] Eremin, Y., **Doicu, A.**, Wriedt, T.: *The numerical scheme of the discrete sources method to analyze 3D plasmonic nanostructures accounting for the non-local effect*, Journal of Computational Physics, 388, pp. 357-370, 2019.€132234€
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- [39] **Fuentes Reyes, M., Auer, S., Merkle, N. M., Henry, C., Schmitt, M.**: *SAR-to-Optical Image Translation Based on Conditional Generative Adversarial Networks - Optimization, Opportunities and Limits*, Remote Sensing, 11 (17), pp. 1-19, 2019.€129009€
- [40] Garane, K., Koukoulis, M.-E., Verhoelst, T., Lerot, C., **Heue, K.-P.**, Fioletov, V., Balis, D., Bais, A., Bazureau, A., Dehn, A., Goutail, F., Granville, J., Griffin, D., Hubert, D., Keppens, A., Lambert, J.-C., **Loyola, D.**, McLinden, C., Pazmino, A., Pommereau, J.-P., Redondas, A., **Romahn, F., Valks, P.**, Van Roozendael, M., **Xu, J.**, Zehner, C., Zerefos, C., **Zimmer, W.**: *TROPOMI/5SP total ozone column data: global ground-based validation and consistency with other satellite missions*, Atmospheric Measurement Techniques (AMT), 12 (10), pp. 5263-5287, 2019.€130476€
- [41] **Ge, N., Zhu, X. X.**: *Bistatic-like Differential SAR Tomography*, IEEE Transactions on Geoscience and Remote Sensing, 57 (8), pp. 5883-5893, 2019.€120772€
- [42] Geiß, C., Leichtle, T., Wurm, M., Aravena Pelizari, P., Standfuß, I., **Zhu, X. X.**, So, E., Siedentop, S., Esch, T., Taubenböck, H.: *Large-Area Characterization of Urban Morphology: Mapping Built-Up Height and Density with the TanDEM-X Mission and Sentinel-2*, IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing, 12 (8), pp. 2912-2927, 2019.€130000€
- [43] **Häberle, M., Werner, M., Zhu, X. X.**: *Geo-spatial text-mining from Twitter - a feature space analysis with a view toward building classification in urban regions*, European Journal of Remote Sensing, 52 (S2), pp. 2-11, 2019.€120452€

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- [45] **Hedelt, P., Efremenko, D. S., Loyola, D.**, Spurr, R., Clarisse, L.: *Sulfur dioxide layer height retrieval from Sentinel-5 Precursor/TROPOMI using FP\_ILM*, Atmospheric Measurement Techniques (AMT), 12 (10), pp. 5503-5517, 2019.€126653€
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- [47] **Hoffmann, E. J., Wang, Y., Werner, M., Kang, J., Zhu, X. X.**: *Model Fusion for Building Type Classification from Aerial and Street View Images*, Remote Sensing, 11 (11), pp. 1259/1-1259/20, 2019.€128115€
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- [49] **Hong, D.**, Yokoya, N., Chanussot, J., **Zhu, X. X.**: *An Augmented Linear Mixing Model to Address Spectral Variability for Hyperspectral Unmixing*, IEEE Transactions on Image Processing, 28 (4), pp. 1923-1938, 2019.€122568€
- [50] **Hong, D.**, Yokoya, N., Chanussot, J., **Zhu, X. X.**: *CoSpace: Common Subspace Learning from Hyperspectral-Multispectral Correspondences*, IEEE Transactions on Geoscience and Remote Sensing, 57 (7), pp. 4349-4359, 2019.€122307€
- [51] **Hong, D.**, Yokoya, N., **Ge, N.**, Chanussot, J., **Zhu, X. X.**: *Learnable Manifold Alignment (LeMA): A Semi-supervised Cross-modality Learning Framework for Land Cover and Land Use Classification*, ISPRS Journal of Photogrammetry and Remote Sensing, 147, pp. 193-205, 2019.€122304€
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- [60] **Koch, T., Körner, M., Fraundorfer, F.**: *Automatic and Semantically-Aware 3D UAV Flight Planning for Image-Based 3D Reconstruction*, Remote Sensing, 11, pp. 1-29, 2019.€132236€
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