



# Fellows

# 2018



Hanse-Wissenschaftskolleg  
Institute for Advanced Study



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Institute for Advanced Study



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Hanse-Wissenschaftskolleg  
Institute for Advanced Study



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# Brain

## 2018



## Yulia Apalkova

HWK Twin Fellow

*Brain*

### **Fellowship**

07/2018

### **Home institution**

Russian Academy of Sciences  
Department of Cross-Cultural Psychology  
and Human Ethology  
Institute of Ethnology and Anthropology  
Moscow  
Russia

### **Cooperation partner**

Dr. Bernhard Fink  
*Hanse-Wissenschaftskolleg*





## The Evolution and Function of Human Dance

(Contributions to Dr. Bernhard Finks's project)

I propose that humans have evolved cognitive mechanisms for the assessment of social information from body movement. These adaptations, together with language and music skills, may then have been used to share information beyond the mating context, thus facilitating ritualized forms of social exchange to build coalitions and strengthen social cohesion through synchronous activity. Social bonding through dance thus could have evolved in consequence of the adaptive problem of identifying honest cues of quality from body movement.

I will review and evaluate evidence for conflicting theories on the evolution and social function of human dance. I aim to elucidate why dance has such a prominent role in human society and develop strategies for investigation of remaining questions. I will use insights for the formulation of future research directions and strategies, with an emphasis on the importance of considering motor behavior in investigation of human social perception.

## **Prof. Dr. Wolfgang Detel**

HWK Fellow  
*Brain*

### **Fellowship**

02/2018

### **Location**

Hamburg  
Germany

### **Cooperation partner**

Jun.-Prof. Dr. Jin Hyun Kim  
*Hanse-Wissenschaftskolleg*





## Publikationsprojekt: Schlüsselthemen musikalischer Grundlagenforschung

Im jüngeren interdisziplinären Forschungszusammenhang wird dem Phänomen Musik verstärkt Aufmerksamkeit gewidmet: Es wird untersucht, welche funktionalen Gemeinsamkeiten und Unterschiede Musik und Sprache haben, ob sich in vorsprachlicher sozialer Interaktion und Koordination – wie in derjenigen zwischen Kleinkind und Mutter – ein als »musikalisch« zu bezeichnendes Verhalten beobachten lässt, und ob Musik eine fundamentale Rolle für die Konstitution des menschlichen Bewusstseins spielt. Dabei zeigt sich Musik als eine Grundfähigkeit des Menschen, deren adäquates Verständnis eine Neukonzeptualisierung von Musik erforderlich macht.

Diese menschliche Grundfähigkeit und ihre zahlreichen Aspekte werden im Rahmen des Projekts erforscht. Unter Berücksichtigung relevanter vormoderner wie moderner bewusstseinsphilosophischer Theorien wird nach Kategorien und Prinzipien gefragt, durch die sich – nach Carl Dahlhaus – ein bestimmtes Phänomen als Musik konstituiert. Um bereits etablierte Forschungsansätze im Bereich Musikphilosophie für eine zeitgemäße musikalische Grundlagenforschung zu öffnen, wird interdisziplinär ausgerichtete kognitionswissenschaftliche Musikforschung einbezogen, in der Musik als kognitive Funktion bzw. kognitives System untersucht wird.

## Dr. Bernhard Fink

HWK Fellow

*Brain*

### **Fellowship**

05/2018 - 02/2019

### **Home institution**

Georg-August-Universität Göttingen

Biologische Persönlichkeitspsychologie

Georg-Elias-Müller-Institut für Psychologie

Göttingen

Germany

### **Cooperation partner**

Yulia Apalkova

*Russian Academy of Sciences*





## The Evolution and Function of Human Dance

I propose that humans have evolved cognitive mechanisms for the assessment of social information from body movement. These adaptations, together with language and music skills, may then have been used to share information beyond the mating context, thus facilitating ritualized forms of social exchange to build coalitions and strengthen social cohesion through synchronous activity. Social bonding through dance thus could have evolved in consequence of the adaptive problem of identifying honest cues of quality from body movement.

I will review and evaluate evidence for conflicting theories on the evolution and social function of human dance. I aim to elucidate why dance has such a prominent role in human society and develop strategies for investigation of remaining questions. I will use insights for the formulation of future research directions and strategies, with an emphasis on the importance of considering motor behavior in investigation of human social perception.

## **Prof. Dr. Peter Haddawy**

HWK Fellow

*Brain*

### **Fellowship**

06/2018 - 08/2018

### **Home institution**

Mahidol University  
Faculty of Information and  
Communication Technology  
Bangkok  
Thailand

### **Cooperation partners**

Prof. Dr. Christian Freksa,  
Prof. Dr. Ron Kikinis  
*University of Bremen*





## Intelligent Environments Supporting Learning and Decision Making in Complex Dynamic Medical Domains

The proposed work on intelligent environments for learning and decision making in complex dynamic medical domains will be approached from two perspectives. Work on Intelligent Surgical Training Systems will seek to help realize the potential of surgical simulation to revolutionize the teaching of surgery. While simulation has the promise to address numerous challenges facing medical schools, current simulation environments have not yet fully realized this promise due to the lack of intelligence in the simulations. We will address teaching of psychomotor skills by developing techniques to objectively assess surgical procedures, outcomes, and the relation between the two and to use this to generate tutorial feedback. We will address teaching of decision making by developing student modeling techniques and automated pedagogical strategies to teach pre-operative and intra-operative decision making. Work on Dynamic Model Construction for Situation Awareness in Crowdsourcing for Disease Surveillance seeks to leverage the availability of smartphones and network coverage in developing countries to address the problem of rapidly and precisely detecting disease outbreaks. We will develop techniques to automatically construct ecological niche models for vector borne diseases to perform integration and interpretation of crowdsourced data.

## Jun.-Prof. Dr. Jin Hyun Kim

HWK Fellow

*Brain*

### **Fellowship**

02/2018 - 03/2018

### **Home institution**

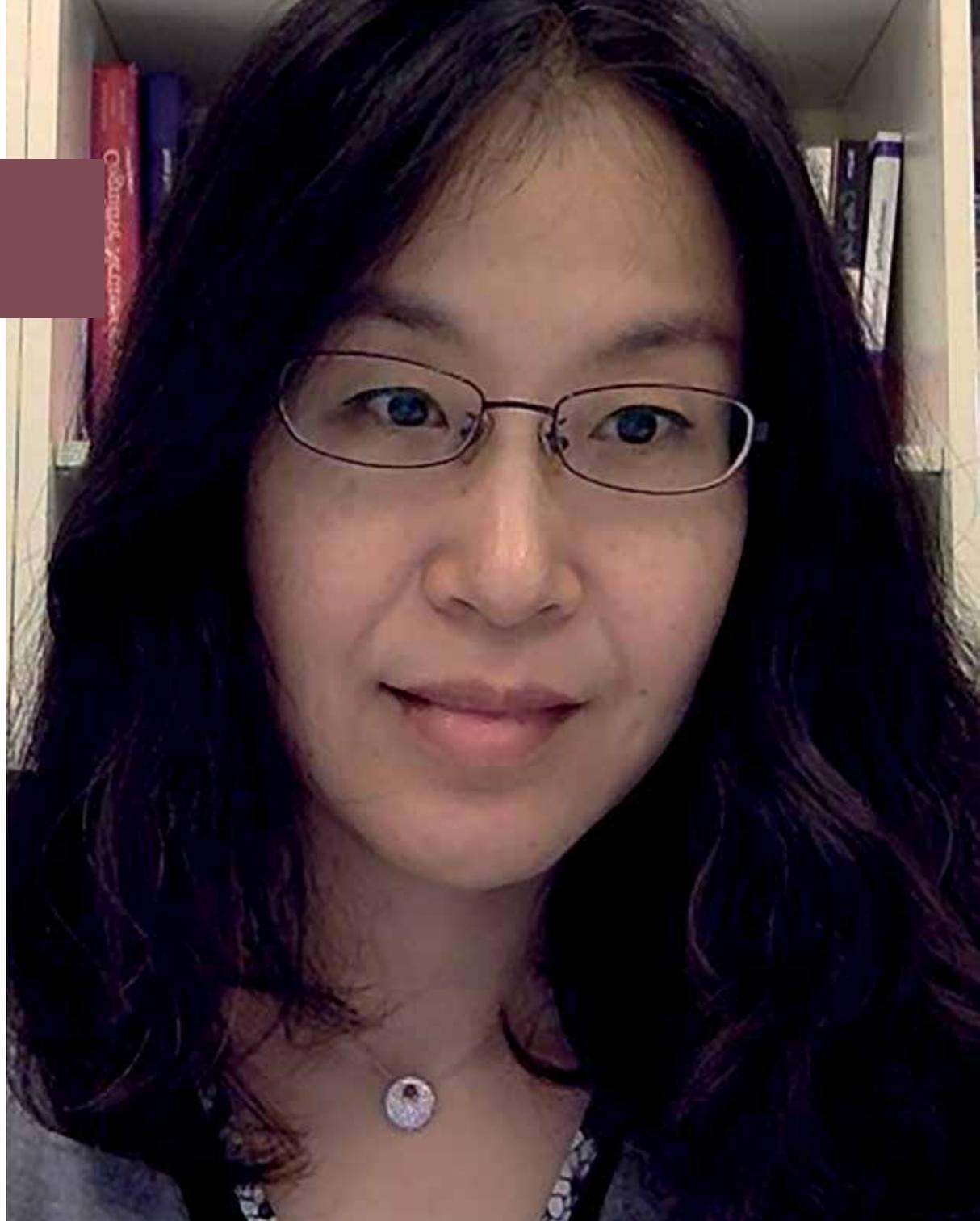
Humboldt-Universität zu Berlin  
Institut für Musikwissenschaft und  
Medienwissenschaft  
Berlin  
Germany

### **Cooperation partners**

Prof. Dr. Johann Kreuzer  
*University of Oldenburg*

Prof. Dr. Georg Mohr  
*University of Bremen*

Prof. Dr. Wolfgang Detel  
*Hanse-Wissenschaftskolleg*





## Schlüsselthemen musikalischer Grundlagenforschung: Interdisziplinäre Musikforschung und Musikphilosophie heute

Im jüngeren interdisziplinären Forschungszusammenhang wird dem Phänomen Musik verstärkt Aufmerksamkeit gewidmet: Es wird untersucht, welche funktionalen Gemeinsamkeiten und Unterschiede Musik und Sprache haben, ob sich in vorsprachlicher sozialer Interaktion und Koordination – wie in derjenigen zwischen Kleinkind und Mutter – ein als »musikalisch« zu bezeichnendes Verhalten beobachten lässt, und ob Musik eine fundamentale Rolle für die Konstitution des menschlichen Bewusstseins spielt. Dabei zeigt sich Musik als eine Grundfähigkeit des Menschen, deren adäquates Verständnis eine Neukonzeptualisierung von Musik erforderlich macht. Diese menschliche Grundfähigkeit und ihre zahlreichen Aspekte werden im Rahmen des Projekts erforscht.

Unter Berücksichtigung relevanter vormoderner wie moderner bewusstseinsphilosophischer Theorien wird nach Kategorien und Prinzipien gefragt, durch die sich – nach Carl Dahlhaus – ein bestimmtes Phänomen als Musik konstituiert. Um bereits etablierte Forschungsansätze im Bereich Musikphilosophie für eine zeitgemäße musikalische Grundlagenforschung zu öffnen, wird interdisziplinär ausgerichtete kognitionswissenschaftliche Musikforschung einbezogen, in der Musik als kognitive Funktion bzw. kognitives System untersucht wird.

## **Dr. Asma Naz**

HWK Junior Fellow  
*Brain*

### **Fellowship**

09/2018 - 01/2019

08/2019 - 12/2019

### **Home institution**

The University of Texas at Dallas  
antÉ Institute  
Richardson, TX  
United States of America

### **Cooperation partner**

Prof. Dr. Rainer Malaka  
*University of Bremen*

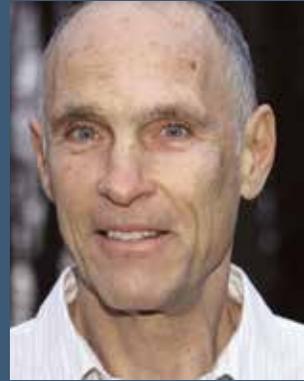




## Design of Perception-Based Interactive Architecture

The research focuses on designing a new form of human-space interaction pertinent to architecture. It explores a real-world concept of an adaptive, interactive, spatially optimized living space for the rapidly growing, new-generation, mobile, tech professionals, such as Silicon Valley workers, freelancers and global expatriates. It is a response to the acute housing crisis they currently face in high density cities, such as San Francisco, New York, London and Hongkong. Through interaction, the user can modify sensory design elements of light, color, texture or material to create possible emotional spatial qualities, such as warm, cool, spacious, intimate, exciting or calm, in order to support daily living. Interaction is regulated by a set of design principles formulated from correlations between design elements and space perception.

The objective is to investigate the adaptive process of the interactive living space involving neural network and »deep learning«. Neural networks mimic how the brain works and can be trained to learn from examples. In artificial intelligence, deep learning is a way of training neural networks through application of image-recognition. The purpose is to enable the space the capacity to »learn« to make possible spatial decisions suitable for occupants' needs. Research scope involves design of an interaction interface. Virtual environment can be used as a potential evaluation tool for the space.



# Earth 2018



## Assoc. Prof. Dr. Iliana B. Baums

HWK Fellow  
*Earth*

### **Fellowship**

05/2018 - 08/2018

### **Home institution**

Pennsylvania State University  
Department of Biology  
University Park, PA  
United States of America

### **Cooperation partners**

Prof. Dr. Nicole Dubilier  
*Max Planck Institute for Marine Microbiology,  
Bremen*

Prof. Dr. Christian Wild  
*University of Bremen*





## The Role of Microbes in Mitigating Stress of Deep-Sea Corals in Response to Oil and Dispersants Exposure

The project will examine the role of partnerships between microbes and deep-sea coral animals in mitigating environmental stress. Corals provide the structure of marine ecosystems similar to trees. Yet, corals are severely threatened. Coral stressors range from oil spills to a warming ocean, but interactions with microbes might reduce some of this stress.

My previous work has concentrated on the interaction between shallow corals and their eukaryotic partners, single-celled algae. During my HWK Fellowship, I will expand this work to include the understudied prokaryotic microbes of deep sea corals found inside the animal tissue.

The 2010 Deep Water Horizon Oil spill was the largest oil spill in history and large quantities of oil and dispersant reached deep sea corals. To understand the effects of the spill, we experimentally exposed deep sea corals to a range of oil and dispersant concentrations. Surprisingly, corals, or more likely their microbes, seemed to be able to utilize the oil to an extent. Thus, the host and microbial community were processed with metagenomic and metabolomics methods. Analysis of these data requires computational techniques that I hope to learn from experts in the field. Thus, I am proposing to work with Prof. Nicole Dubilier from the MPI for Marine Microbiology and Prof. Christian Wild, from the University of Bremen. The result will be a groundbreaking assessment of the role of microbes in mitigating oil stress in deep sea corals.

## **Prof. Dr. Guy P. Brasseur**

OLB Foundation Fellow at HWK  
*Earth*

### **Fellowship**

03/2018

### **Home institution**

Max-Planck-Institut für Meteorologie  
Hamburg  
Germany

### **Cooperation partners**

Prof. Dr. Reto Weiler  
*Hanse-Wissenschaftskolleg*  
Karin Katerbau  
*Stiftung Oldenburgische Landesbank AG (OLB)*





## Desired Trajectories for the Earth System in the 21st Century

Prof. Dr. Guy P. Brasseur, langjähriger Direktor des Max-Planck-Instituts für Meteorologie, Hamburg, und Gründungsdirektor des *Climate Service Center (CSC)* war 2018 als OLB-Stiftungsfellow am HWK. OLB-Stiftungsfellows werden für kurze Aufenthalte an das HWK eingeladen. Das Fellowship ist durch zwei wesentliche Veranstaltungen geprägt, nämlich einen öffentlichen Vortrag im Rahmen der Reihe »OLB-Forum Wissen und Zukunft« sowie einen gemeinsam mit dem HWK vorbereiteten und durchgeführten Workshop.

Der öffentliche Vortrag von Prof. Brasseur mit dem Titel »Ist der Klimawandel vorhersagbar« befasste sich mit der Entwicklung zutreffender Wettervorhersagen, den besonderen Herausforderungen bei der Vorhersage eines Klimawandels

sowie der Entwicklung politischer Strategien. Gehalten hat Prof. Brasseur diesen Vortrag am 14. März 2018 im com.media-Veranstaltungszentrum in Delmenhorst.

»Desired Trajectories for the Earth System in the 21st Century« (Welche Entwicklung sollte das System Erde im 21. Jahrhundert nehmen?) war das Thema des Workshops im HWK. Vom 12. bis 14. März trafen sich Wissenschaftlerinnen und Wissenschaftler unterschiedlichster Disziplinen, um über die großen Herausforderungen zu diskutieren, denen sich die Erde mit ihrer Vielzahl menschlicher Gesellschaften gegenübersteht. In Vorträgen und Diskussionen wurden Erkenntnisse und Fragestellungen aus der Klimaforschung, der Meereskunde, der Stadtforschung, der Ökonomie, den Agrarwissenschaften und der Energieforschung thematisiert.

## Dr. Hayley Cawthra

HWK Junior Fellow  
*Earth*

### **Fellowship**

11/2017 - 01/2018

05/2019 - 06/2019

### **Home institution**

Council for Geoscience  
Bellville, Western Cape  
South Africa

### **Cooperation partner**

PD Dr. Matthias Zabel  
*MARUM – Center for Marine Environmental  
Sciences, University of Bremen*





## Sea-Level Fluctuations, Submerged Landscapes on the South African Continental Shelf, and the Implications for Human Evolution

Sea level changes constantly, in accordance with glacial-interglacial cycles every ~100,000 years. A certain consequence is that during the glacials, what is now seafloor becomes exposed subaerially as a coastal plain. This project aims to understand a submerged terrestrial landscape on the continental shelf of the South African South Coast. This region has one of the richest Middle Stone Age archaeological records in the world, holding rich archives of early modern humans. During the time of occupation, sea level has been significantly lower than it is at present for about 90% of this time, so understanding this shelf is critically important. The bilateral German-South African RAIN (Regional Archives for Integrated iNvestigations) project aims to expand the current state of knowledge on the dynamics of South African Late Quaternary climate change by comparing marine and terrestrial proxy-records. The link between the palaeoclimate research in RAIN, and this approach of considering human evolution at a regional hotspot, is where the novel approach of this collaborative work lies. The South Coast is situated at the juncture of winter- and summer rainfall zones as well as the Benguela and Agulhas Currents, contains rich palaeoenvironmental archives, and is ideally located to study past sea-level change. The anticipated benefits include geological information which will be fed into holistic models for changing ecosystems and how it may have affected human use of this landscape.

## Dr. Lata Gawade

HWK Junior Fellow  
*Earth*

### **Fellowship**

02/2018 - 09/2018

### **Home institution**

CSIR-National Institute of Oceanography  
Biological Oceanography Division  
Dona Paula, Goa  
India

### **Cooperation partner**

Dr. Tim Jennerjahn  
*Leibniz Centre for Tropical Marine Research (ZMT),  
Bremen*





## Linking Variations in Particulate Organic Matter Origin, Composition and Sources to Bacterial Metabolic Rates, and Community Composition – Implications for Carbon Cycling in Estuaries

A large fraction of organic matter (OM) from various sources and composition brought by rivers from terrestrial ecosystems gets lost in the estuaries resulting in ecological and biogeochemical changes. Estuaries play a dual biogeochemical role, as a natural reactor for the mineralization of OM entered from terrestrial systems and as vents for degassing of generated CO<sub>2</sub>, hence they are highly dynamic and productive systems. Heterotrophic bacteria play a significant role to mineralize the OM. Modification of particulate organic matter (POM) by bacteria in estuaries depends on its sources, chemical composition and also the bacterial community structure. I hypothesise that the land driven terrigenous POM having wide variations in origin and composition

is getting modified by the bacterial communities driven from land in mutual relation with those from the estuary. Due to the variations in community structure, their metabolic activities and mineralization rates, preferences for the OM will be different which will have an impact on CO<sub>2</sub> flux from the estuaries. To investigate the hypothesis, I propose to study the link between bacterial metabolic rates, community composition, elemental analyser isotope ratio mass spectrometry of POM and its implications to CO<sub>2</sub> flux in a tropical estuary. POM, hexosamines, amino acids and lignin-phenols analysis will be carried out in Germany in cooperation with Dr. Tim Jennerjahn at the Leibniz Centre for Tropical Marine Research (ZMT) in Bremen.

## Dr. Colleen M. Hansel

HWK Fellow  
*Earth*

### **Fellowship**

07/2018 - 05/2019

### **Home institution**

Woods Hole Oceanographic Institution  
Department of Marine Chemistry and Geochemistry  
Woods Hole, MA  
United States of America

### **Cooperation partners**

Prof. Dr. Oliver Zielinski  
*Institute for Chemistry and Biology of the Marine  
Environment (ICBM), University of Oldenburg*

Dr. Dirk de Beer  
*Max Planck Institute for Marine Microbiology,  
Bremen*





## Unraveling the Complex Role of Reactive Oxygen Species in the Health and Activity of Marine Microorganisms

The health and function of the ocean is controlled by the production and consumption of a broad spectrum of chemicals. There is an emerging recognition that highly reactive and hence low abundance and short-lived chemicals are at the hub of many biogeochemical cycles. These short-lived chemicals include partially reduced forms of oxygen, referred to as reactive oxygen species (ROS) or oxygen radicals. Due to their fast formation and consumption, these ROS are notoriously difficult to measure, and yet are key to the biogeochemistry and health of the ocean. While ROS, including superoxide, are known for causing stress and even death in organisms, recent findings indicate that these same chemicals may also be essential for life. Accordingly, the overarching

goal of this Hanse-Wissenschaftskolleg (HWK) fellowship is to obtain a better understanding of the distributions of ROS within the ocean and the underlying processes responsible for their formation. The role of superoxide in microbial health will be investigated in controlled laboratory incubations of common marine microorganisms. New instruments will also be developed and deployed to make novel observations of the levels and distributions of superoxide within coastal waters and sediments. Enabled by a cross-institution collaboration between the fellow and complementary HWK affiliated research groups, this research will provide key insight into the role of ROS in shaping the health and biogeochemistry of the ocean.

## Dr. Mati Kahru

HWK Fellow  
*Earth*

### **Fellowship**

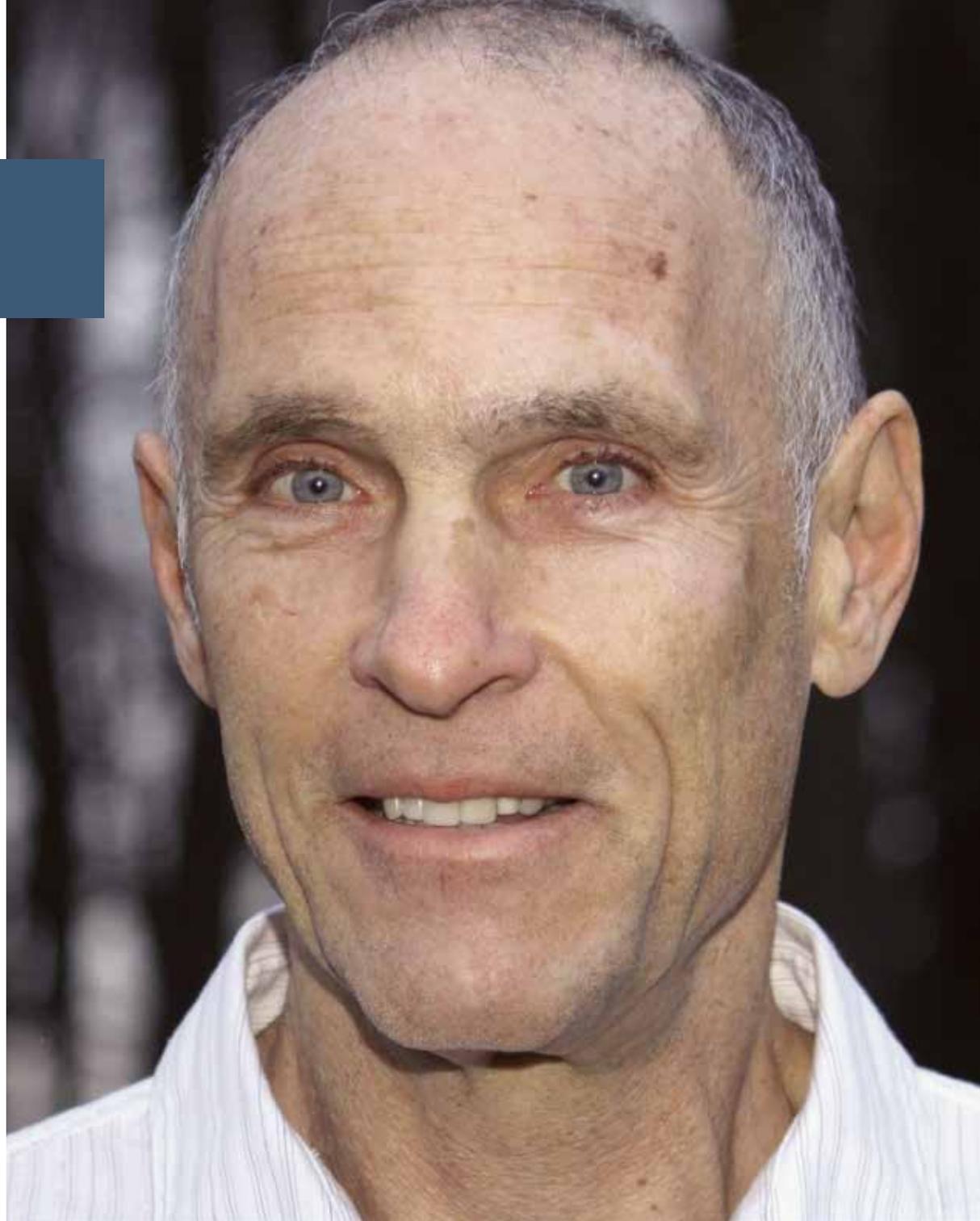
06/2018 - 07/2018

### **Home institution**

University of California  
Scripps Institution of Oceanography  
La Jolla, CA  
United States of America

### **Cooperation partner**

Prof. Dr. Astrid Bracher  
*Alfred Wegener Institute,  
Helmholtz Centre for Polar and Marine  
Research (AWI), Bremerhaven*





## Satellite Detection of Global Change in Phytoplankton and of the Causing Factors with Emphasis on European Marine Waters

The oceans are a fundamental component of the Earth's biosphere, producing about half of the oxygen on the planet. Climate change is affecting marine and terrestrial environments with economic and human health consequences. Due to the global scale of these changes, satellite observations are essential to detect and understand these changes. Here we propose to develop new methods and perform new analysis that will document and explain changes in phytoplankton communities in the oceans. Phytoplankton are microscopic plants in oceans and other water bodies that are the base of the food chain and produce almost all of the oxygen originating from the oceans. We will study European marine

waters such as the Baltic and North Seas but will modify and extend our analysis to other oceanic areas. We already have compiled a 36-year long time series of cyanobacteria accumulations in the Baltic Sea (Kahru and Elmgren 2014) which is the longest satellite-derived time series of a marine biological variable anywhere in the world. Toxic cyanobacteria blooms are a worldwide phenomenon associated with eutrophication and associated with undesirable effects on the ecosystems. In our time series we see dramatic changes in the frequency of these toxic accumulations during the last 36 years in the Baltic Sea but we still cannot explain these dramatic temporal changes.

## **Prof. Dr. Darlene R. Ketten**

ICBM Fellowship at HWK  
*Earth*

### **Fellowship**

09/2017 - 06/2018

### **Home institution**

Boston University  
Department of Biomedical Engineering  
Boston, MA  
United States of America

### **Cooperation partners**

Dr. Ilse van Opzeeland  
*Helmholtz Institute for Functional Marine  
Biodiversity at the University of Oldenburg (HIFMB)*

Dr. Olaf Boebel,  
Dr. Angelika Dummermuth  
*Alfred Wegener Institute,  
Helmholtz Centre for Polar and Marine  
Research (AWI), Bremerhaven*





## Ocean Sustainability and the Potential for Anthropogenic Sound Impact

The ocean is inherently a noisy place. Sounds from earthquakes, wind, waves, underwater volcanoes, and animals create natural Ocean sounds, but over the last century, human use of the seas has been increasing Ocean noise. Every human activity, in, on, or near the Ocean, from shipping, fisheries, energy exploration, recreation, military activities, construction, or underwater acoustic research, produces sounds in the hearing range of some marine creature, from ultralow great whales calls, to ultrahigh porpoise sonar signals. Potential impacts include both subtle effects, such as stress in noisy shipping lanes, to direct hearing loss from sounds that injure their ears. Just as we have concerns for traffic and industrial noise, underwater noises may similarly affect marine animal abilities to hear and use sound for communicating, finding food, mating, and avoiding predators.

Although there are many studies from multiple disciplines (underwater acoustics, animal behavior, audiometry, populations, soundscapes), at present there is no comprehensive, cumulative risk analysis of Ocean noise. The goal for the ICBM Fellowship at HWK is to synthesize current data and to facilitate collaborations by scientists to transition results from the lab to the socio-political arena to assist the public, government, military, and industry to responsibly address and mitigate potential noise impacts for a balanced approach to advancing our knowledge of the Ocean and sustaining its populations and resources. In addition, intensified cooperation with Dr. Ilse van Opzeeland will promote the newly founded Helmholtz Institute for Functional Marine Biodiversity at the University of Oldenburg (HIFMB).

**Assoc. Prof. Dr. Peter C. LaFemina**

HWK Fellow  
*Earth*

**Fellowship**

05/2018 - 08/2018

**Home institution**

The Pennsylvania State University  
Department of Geosciences  
University Park, PA  
United States of America

**Cooperation partner**

Prof. Dr. Wolfgang Bach  
*MARUM – Center for Marine Environmental  
Sciences, University of Bremen*





## Triggering of Vulcanian Explosions Through Mineralization and Sealing Hydrothermal Systems

Predicting and forecasting volcanic eruptions is of extreme interest and importance to society because of associated hazards and risks to local and global populations. Most volcanoes show precursory signs of activity (e.g., increased rates of earthquakes, and increased fluxes of volcanic gases) prior to large volume, explosive volcanic eruptions. Modern geophysical (e.g. seismic and geodetic) and geochemical (e.g. gas flux and gas species) monitoring techniques have been quite effective at providing predictive capabilities.

There is a class of volcanoes; however, that exhibit high rates of geophysical and geochemical unrest as their background activity state. These volcanoes are termed persistently restless, persistently active, quiescently active, and/or restless calderas, and their heightened state of activity makes predicting eruptions a difficult task.

Telica volcano, Nicaragua, is a persistently active volcano that experiences periods of high background activity, punctuated by periods of vulcanian explosions recurring on time scales of years to decades. During periods of high background activity, Telica exhibits high rates of seismicity (several hundred seismic events per day) and large fluxes of gases (>100 tons/day  $\text{SO}_2$ ). The vulcanian explosions are hazardous, ejecting ash to several km in altitude and drifting 10's of km downwind, as well as ejecting large blocks (up to 1m in diameter), posing risks to tourists on the volcano, local agricultural communities, and two of the largest cities in Nicaragua.

## Prof. Dr. Rainer Lohmann

ICBM Fellowship at HWK  
*Earth*

### **Fellowship**

01/2018 - 08/2018

### **Home institution**

University of Rhode Island  
Graduate School of Oceanography  
Narragansett, RI  
United States of America

### **Cooperation partners**

Prof. Dr. Thorsten Dittmar  
*Institute for Chemistry and Biology  
of the Marine Environment (ICBM),  
University of Oldenburg*

Dr. Thomas Soltwedel,  
Dr. Melanie Bergmann  
*Alfred Wegener Institute,  
Helmholtz Centre for Polar and Marine  
Research (AWI), Bremerhaven*





## Passive Sampling to Determine the Cycling of Organic Compounds in the Ocean

For the Hanse-Wissenschaftskolleg (HWK) Fellowship, I propose research in support of the HWK Earth section focused on developing novel tools to better understand the cycling of carbon and synthetic, long-lived pollutants in the oceans. The traditional and established ways of investigating the presence of carbon-containing molecules in the oceans rely on the active pumping of seawater through filters, which is a time-consuming, expensive and resource-intensive process. In contrast, I propose to make further use of novel sampling approaches, in which a membrane is suspended in the water for months at a time, enabling the molecules to diffuse and accumulate in the membrane without the use of power. This so-called 'passive sampling' yields a time-

integration of molecules present in the oceans, and can then be used to decipher the concentrations and fluxes of these molecules. I propose to work with colleagues from two institutions in the region to (i) test and develop these samplers for better understanding the dynamics of dissolved organic carbon in the oceans working with the ICBM, University of Oldenburg, and (ii) to characterize the presence of various organic pollutants in the North Atlantic Ocean, and derive flows in and out of the Arctic with the Alfred Wegener Institute. The use of these samplers can yield new insights into dissolved organic carbon and pollutant dynamics through smart sampling strategies investigating unprecedented vertical and horizontal coverage of the oceans.

## Asst. Prof. Dr. Natascha Riedinger

HWK Fellow  
*Earth*

### **Fellowship**

06/2018 - 08/2018

### **Home institution**

Oklahoma State University  
Boone Pickens School of Geology  
Stillwater, OK  
United States of America

### **Cooperation partners**

Prof. Dr. Sabine Kasten  
*Alfred Wegener Institute,  
Helmholtz Centre for Polar and Marine  
Research (AWI), Bremerhaven*

Prof. Dr. Michael W. Friedrich  
*University of Bremen*





## Collaborative Studies on Trace Metals Connected to Sulfur, Manganese and Iron Cycling in Dynamic Marine Systems: Implications for the Deep Biosphere and Paleoproxy

The goal of this work is to better understand the role of trace metals in marine sedimentary environments and their relevance for microbial life. The Argentine Basin in the South Atlantic provides an excellent marine system to study the distribution of trace metals because of changing sedimentary conditions that can lead to fast burial of reactive minerals from the surface to the deeper sediment layers. Such reactive minerals can then be utilized by microbial communities in the deeper sediments leading to concomitant release of specific trace metals. Some of these released metals can affect the microbial life due to their importance as bio-essential nutrients.

As specific trace metals can also be used to reconstruct ancient oceanic and atmospheric conditions (so called proxies), microbial related deep-subsurface mineral alteration can thus strongly impact their application as a paleoproxy. In close collaboration with researchers from the Alfred Wegener Institute and the MARUM at the University of Bremen, I plan to generate high-resolution concentration profiles of trace metals using sediment and pore water samples from the Argentine Basin, to determine how trace metal release can influence deep biosphere processes, as well as how trace metals, used as paleoproxies, can be altered by the microbial community long after the initial deposition.

## Dr. Alexey A. Sukhotin

HWK Fellow  
*Earth*

### **Fellowship**

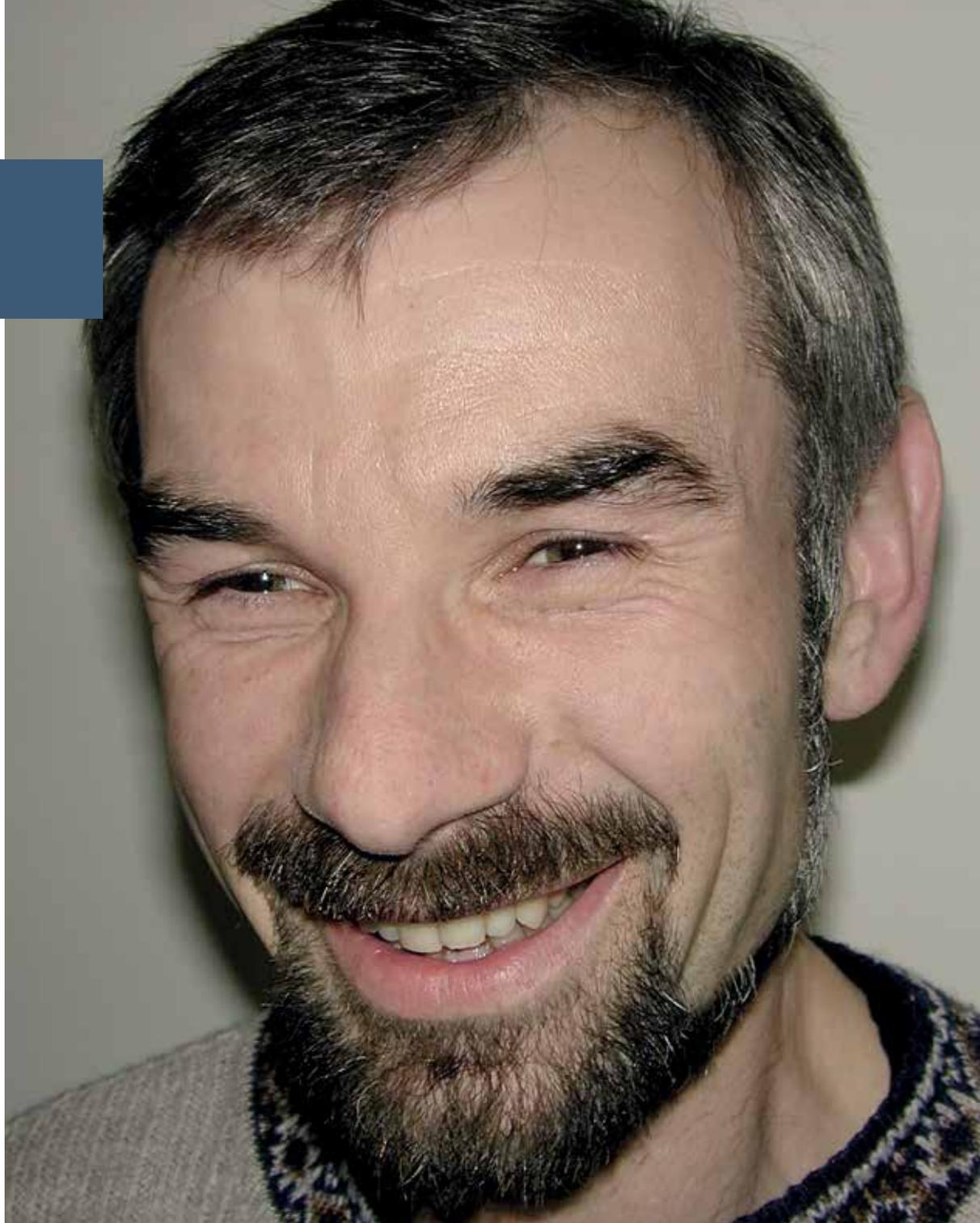
01/2018 - 03/2018

### **Home institution**

Zoological Institute of Russian  
Academy of Sciences  
St. Petersburg  
Russia

### **Cooperation partner**

Prof. Dr. Hans-Otto Pörtner  
*Alfred Wegener Institute,  
Helmholtz Centre for Polar and Marine  
Research (AWI), Bremerhaven*





## Effect of Body Size on Metabolic Rate in Marine Invertebrates – Role of Fatty Acids Composition of Biomembranes

A decline of mass-specific metabolic rate with body size increase in animals is a widely known phenomenon, indicating fundamental allometric changes in the efficiency of cellular metabolism and mitochondrial functioning; however, the mechanistic causes of these differences still remain unclear. At the biochemical level, the most consistent hypothesis on the size-related metabolic rate decline in mammals is the Membrane Pacemaker Theory (MPT), according to which the levels of polyunsaturated fatty acids in biomembranes change with body size and through the variations in the fluidity and permeability of membranes affect the rates of membrane-dependent cellular processes and hence the overall whole-animal metabolic rate. Virtually nothing is known

about the allometry of cellular respiration in invertebrates and the role of membranes composition in setting the metabolic levels in these animals.

The proposed project aims to test the allometry of metabolic rate, trans-membrane leak and functional capacities of mitochondria in association with the MPT on marine invertebrates. The successful fulfillment of the project will allow to expand the applicability of the MPT not only to mammals, but to all multicellular animals, which would make this theory indeed universal. This, in turn, will make possible to explain and give prove to one of the fundamental rules in biology, a metabolic scaling law. In case the MPT appears not applicable to invertebrates its universality will be rejected.

**Prof. Dr. Marta E. Torres**

HWK Twin Fellow  
*Earth*

**Fellowship**

08/2018

**Home institution**

Oregon State University  
College of Oceanic & Atmospheric Sciences  
Corvallis, OR  
United States of America

**Cooperation partner**

Asst. Prof. Dr. Natascha Riedinger  
*Hanse-Wissenschaftskolleg*





## Contributions to Collaborative Studies on Trace Metals Connected to Sulfur, Manganese and Iron Cycling in Dynamic Marine Systems: Implications for the Deep Biosphere and Paleoproxy

(Contributions to Asst. Prof. Dr. Natascha Riedinger's project)

The goal of this work is to better understand the role of trace metals in marine sedimentary environments and their relevance for microbial life. The Argentine Basin in the South Atlantic provides an excellent marine system to study the distribution of trace metals because of changing sedimentary conditions that can lead to fast burial of reactive minerals from the surface to the deeper sediment layers. Such reactive minerals can then be utilized by microbial communities in the deep-sea environments leading to concomitant release of specific trace metals. Some of these released metals can affect the microbial life due to their importance as bio-essential nutrients.

As specific trace metals can also be used to reconstruct ancient oceanic and atmospheric conditions (so called proxies), microbial related deep-subsurface mineral alteration can thus strongly impact their application as a paleoproxy. In close collaboration with researchers from the Alfred Wegener Institute and the MARUM at the University of Bremen, I plan to generate high-resolution concentration profiles of trace metals using sediment and pore water samples from the Argentine Basin, to determine how trace metal release can influence deep biosphere processes, as well as how trace metals, used as paleoproxies, can be altered by the microbial community long after the initial deposition.

## Dr. Scott D. Wankel

HWK Fellow  
*Earth*

### **Fellowship**

07/2018 - 05/2019

### **Home institution**

Woods Hole Oceanographic Institution  
Department of Marine Chemistry and Geochemistry  
Woods Hole, MA  
United States of America

### **Cooperation partners**

Prof. Dr. Nicole Dubilier,  
Dr. Dirk de Beer  
*Max Planck Institute for Marine Microbiology,  
Bremen*





## Controls on Fungal Nitrogen Metabolisms in Coastal Ecosystems

Nitrogen often plays a central role in controlling the productivity of ecosystems. Indeed human recognition of this fact led to the 'green revolution' – the industrial production of fertilizer, expansion of agriculture and an explosion of human population growth. Over the past century, however, this revolution has come at a cost as the impact of human activity has led to the degradation of aquatic ecosystems worldwide, especially coastal ecosystems where rivers continually deliver nitrogen from agricultural run-off, sewage effluent and industrial waste and where population growth is most intense. Towards better understanding the fate of nitrogen in coastal systems my research group recently discovered that an important amount of

nitrogen was being converted into nitrous oxide ( $N_2O$ ), a powerful greenhouse gas – and further that unexpected organisms were involved – fungi. Fungi are not widely recognized as important contributors to nitrogen cycling, yet I propose that their importance in some processes may have been overlooked. For this project, I propose to explore the potential for fungi (including yeasts) in coastal ecosystems to catalyze important transformations of nitrogen. My approach involves collaborating with a number of experts in the Bremen area to make fine-scale geochemical measurements, quantify chemical signatures of fungi in sediments and determine how different types of conditions influence the cycling of nitrogen by fungi.

## Prof. Dr. Michael J. Whiticar

HWK Fellow  
*Earth*

### **Fellowship**

02/2018 - 05/2018

03/2019 - 06/2019

### **Home institution**

University of Victoria  
School of Earth and Ocean Sciences  
Victoria, BC  
Canada

### **Cooperation partners**

Prof. Dr. Gerhard Bohrmann,  
Prof. Dr. Kai-Uwe Hinrichs  
*MARUM – Center for Marine Environmental  
Sciences, University of Bremen*





## Methane on Earth – Understanding and Tracking Methane Occurrences and Interactions between the Bio-, Geo-, Hydro-, Cryo- and Atmospheres

Methane is the most abundant organic molecule on Earth, with 5,000 to 10,000 gigatonnes carbon (GtC) in the upper lithosphere, including the 5,000-10,000 GtC gas hydrates and 600 GtC natural gas deposits. This equals the summed total of carbon in the atmosphere (850 GtC), land biota (830 GtC), peat (250 GtC), soil (1400 GtC), dissolved organic matter (980 GtC), petroleum (290 GtC) and coal (3,500 GtC). Methane is important for energy and the environment. We consume ~3 GtC/year of natural gas (mostly methane) – comparable with oil (4,179 Million Tons) and coal (3,867 Million Tons of Oil Equivalent), and thus represents a key fossil fuel that will continue to be used in the near future.

Environmentally, methane is a strong greenhouse gas with a Global Warming Potential on the decadal, human dimension time frame, that is 104 times that of of

Carbon Dioxide (CO<sub>2</sub>). As such, methane tropospheric emissions are just as important to understand and control as CO<sub>2</sub>. Methane is principally derived from organic matter by biological, diagenetic or thermogenic maturation mechanisms. We have extensive knowledge on formation, fates and importance of methane on Earth. However, there are ambiguous, controversial and unanswered questions. The substantial advances made in understanding methane in the established and new fields are in disparate locations with no recent unifying publication.

During my HWK Fellowship, I propose to harmonize and collate the diverse knowledge about methane on Earth, together with an international, HWK-lead symposium into a book, volume and/or series of papers.

## Prof. Dr. Jing Zhang

HWK Fellow  
*Earth*

### **Fellowship**

07/2018 – 11/2018

### **Home institution**

East China Normal University  
State Key Laboratory of Estuarine  
and Coastal Research  
Shanghai  
People's Republic of China

### **Cooperation partners**

Prof. Dr. Gerhard Kattner,  
Prof. Dr. Boris Koch  
*Alfred Wegener Institute,  
Helmholtz Centre for Polar and Marine  
Research (AWI), Bremerhaven*





## Isolation and Determination of Trace Elements Combined with Organic Ligands in the Ocean

Interactions between dissolved trace elements and organic ligands in seawater play an important role in ocean biogeochemistry, ranging from regulating primary production in surface waters to element cycling in basin-wide scale with feedbacks to climate variability. Those interactions can be complex and may have important consequences, such as carbon sequestration in the ocean, the process involved in carbon capture and long-term storage of atmospheric carbon dioxide to mitigate or defer global warming.

Crucial aspects of the project include chemical speciation and redox forms of trace elements in the water column, which are influenced by their ability to combine

with organic ligands. For example, ligands in combination with micronutrients – essential elements required by organisms in small amounts throughout their life – have a different reactivity than non-ligand molecules in the sea.

Given the predicted climate changes in the future, the potential of exchange between inorganic and organic complexes in different oceanic provinces, dynamic processes and scenarios will be examined, such as in surface waters dominated by autotrophic organisms or the water column where heterotrophic species play a critical role.

## Assoc. Prof. Dr. Wiebke Ziebis

HWK Fellow  
*Earth*

### **Fellowship**

07/2018 – 04/2019

### **Home institution**

University of Southern California  
Department of Biological Sciences  
Marine Environmental Biology  
Los Angeles, CA  
United States of America

### **Cooperation partners**

Prof. Dr. Sabine Kasten  
*Alfred Wegener Institute,  
Helmholtz Centre for Polar and Marine  
Research (AWI), Bremerhaven*

Dr. Dirk de Beer  
*Max Planck Institute for Marine Microbiology,  
Bremen*





## 1. Oxygen in Deep-Sea Sediments Underlying Oligotrophic Ocean Gyres: A Changing Perspective on Deep-Subsurface Biogeochemical Processes

## 2. Variations of N<sub>2</sub>O Production as a Response to a Changing and Dynamic Environment

1. The seafloor in the vast open ocean regions is largely unexplored because science has concentrated on the ocean margins. Within the last decade efforts have been made by the International Ocean Discovery Program (IODP) to explore the ocean floor in the interior of the Pacific and Atlantic Ocean, which comprise ~ 2 thirds of the global ocean. The investigations revealed surprising differences. For example, oxygen, vital for all aerobic organisms, but also for the cycling of elements, only penetrates very little into the ocean floor (millimeters) in the better-studied margin regions. Below this thin layer the seafloor is devoid of oxygen, and thus dominated by microorganisms that do not require oxygen. In stark contrast, we discovered that oxygen penetrates much deeper into the ocean floor in the open ocean (>100 meters), and thus aerobic microbial communities are thriving here. We are only beginning to understand the nature of these communities and their role in global element cycling.

2. Nitrous oxide (N<sub>2</sub>O), a greenhouse, which significantly adds to global warming and to a thinning of the ozone layer, is constantly increasing in the atmosphere. 55% of global N<sub>2</sub>O emissions are from natural ecosystems. Coastal regions are recognized as important sources of N<sub>2</sub>O, yet the factors influencing the production and emission are not well understood. There are ongoing investigations to find out whether, and under which circumstances the seafloor acts as a source or sink for N<sub>2</sub>O. Although N<sub>2</sub>O is mainly biologically produced, changes to the environment, especially the input of nitrogen-based fertilizer, rising temperatures, and the decrease of oxygen in coastal waters, have shown to lead to increases in N<sub>2</sub>O. Furthermore, our investigations suggest that the movement of tides might have an immense impact on N<sub>2</sub>O dynamics. Given for example the large intertidal area of the Wadden Sea, there is an urgency to understand the impact of a changing environment on N<sub>2</sub>O production and emission.

# Energy

2018



## **Prof. Dr. Traian Dumitrica**

HWK Fellow

*Energy*

### **Fellowship**

06/2018 - 08/2018

01/2019 - 04/2019

### **Home institution**

University of Minnesota, Minneapolis  
Department of Mechanical Engineering  
College of Science and Engineering  
Minneapolis, MN  
United States of America

### **Cooperation partner**

Prof. Dr. Thomas Frauenheim  
*University of Bremen*





## SCC-DFTB Objective Molecular Dynamics Investigations of ZnO Nano-Materials Targeting Thermoelectricity and Energy

The advancements brought by nano-technology enable the development of novel energy applications. The scale itself – so small that individual atoms matter – poses inherent experimental difficulties. To make progress, the development of theoretical models is essential. Because of the small scale, nanostructures are most accurately modeled using atomistic simulations – computer simulations that consider individual atoms. Until recently, atomistic simulations could only be easily carried out on structures that are straight – that possess translational atomic symmetry. A recently developed method termed objective molecular dynamics (OMD) generalizes this treatment to angular and helical symmetries. Thus, OMD allows for efficient and accurate simulation of

nanostructures that are twisted or helical, whether by an external force or inherently. The project concerns the development of new OMD capabilities, by coupling OMD into the popular DFTB+ code developed at University of Bremen, and the application of the developed numerical capability to uncover the thermoelectricity and energy harvesting capabilities of twisted and helical nanostructures. The proposed OMD simulations will break new grounds in exploring the emerging space of screw-dislocated twisted ZnO nanostructures in order to understand their ability to convert heat into electric energy, as well as in exploring the capabilities of ZnO nanobelts to transfer mechanical deformations into electric energy.

## Dr. Lenin Francisco Escamilla Herrera

HWK Twin Fellow

*Energy*

### **Fellowship**

02/2018 - 03/2018

### **Home institution**

National Autonomous University of Mexico

Institute of Nuclear Sciences

Mexico City

Mexico

### **Cooperation partner**

Dr. Christine Gruber

*Hanse-Wissenschaftskolleg*





## Energy and Entropy in Non-Ideal Thermodynamics

(Contributions to Dr. Christine Gruber's project)

Thermodynamics is one of the oldest and most successful theories of physics within its realm of applicability. Arising from statistical microphysics and the behaviour of an ensemble of particles, predictions about the large scale behaviour of a system can be made, describing idealized thermodynamic systems, from the behaviour of gases or fluids to heat machines and cycles.

However, in order to apply the principles of equilibrium thermodynamics in scenarios like in engineering physics, the non-ideal nature of the real world has to be taken into account: effects of dissipation, non-ideal materials, non-extensivity -- all these effects lead to losses in efficiency and energy and unpredictability in the behaviour of machines and cycles.

Furthermore, there are thermodynamic systems which are not regarded as standard, because the underlying microphysics does not follow ordinary statistical principles; i.e. systems governed by long-range forces -- here, ordinary equilibrium thermodynamics is not applicable without modifications.

In this project, we will investigate non-standard thermodynamic systems, aiming at generalizing the four basic laws of thermodynamics in the light of these aspects, seeking applications in the context of black hole thermodynamics. Due to the presence of gravitational long-range interactions, black holes have non-trivial non-standard thermodynamic behaviour, and can illustrate some of the difficulties with non-ideal thermodynamics.

## **Assoc. Prof. Dr. Ernst Ferg**

HWK Fellow

*Energy*

### **Fellowship**

04/2018 - 11/2018

### **Home institution**

Nelson Mandela University  
Department of Chemistry  
Port Elizabeth  
South Africa

### **Cooperation partners**

Dr. Benedikt Hanke,  
Dr. Arne Schuldt  
*DLR-Institut für Vernetzte Energiesysteme e. V.,  
Oldenburg*





## The Use of Li-ion Batteries as Starter, Lighting and Ignition Power Sources in Automotive Vehicles

Various technologies contributed to the advancement of transportation, where the light passenger vehicle has become a virtual household commodity. This has not only increased the use of fossil fuel and its effect on climate change. Various perceived toxic materials are used in the manufacture of components for automobiles. One of these is lead that forms part of the reliable starter, lighting and ignition (SLI) lead-acid battery used for starting cars, even in cold weather. With the recent introduction of Start-Stop technologies of modern vehicles, there has been an ever increased stress on the SLI battery. There have been large technology advancements in new types of batteries, of which the lithium-ion battery is well known in its use as a reliable power source for cell

phones, power tools and the full electric vehicle. The battery makes use of relatively benign chemicals in terms of toxicity, but is known for its flammable nature under certain conditions. The lithium-ion battery would have a significant advantage over the traditional lead-acid battery as a SLI battery. The study will look at the impact of such a replacement and its use in typical rural households found in South Africa, where the possible use of cheaper cells within the battery could have an impact on the safety and health of the consumer. The study will also look at the standardisation and testing requirements that are needed by battery testing laboratories in order to ensure a safe and reliable product.

## Dr. Christine Gruber

HWK Junior Fellow  
*Energy*

### **Fellowship**

11/2017 - 12/2018

### **Home institution**

National Autonomous University of Mexico  
Institute of Nuclear Sciences  
Mexico-City  
Mexico

### **Cooperation partners**

Prof. Dr. Jutta Kunz  
*University of Oldenburg*

Prof. Dr. Domenico Giulini  
*University of Bremen*

Dr. Lenin Francisco Escamilla Herrera  
*Hanse-Wissenschaftskolleg*





## Energy and Entropy in Non-Ideal Thermodynamics

Thermodynamics is one of the oldest and most successful theories of physics within its realm of applicability. Arising from statistical microphysics and the behaviour of an ensemble of particles, predictions about the large scale behaviour of a system can be made, describing idealized thermodynamic systems, from the behaviour of gases or fluids to heat machines and cycles.

However, in order to apply the principles of equilibrium thermodynamics in scenarios like in engineering physics, the non-ideal nature of the real world has to be taken into account: effects of dissipation, non-ideal materials, non-extensivity -- all these effects lead to losses in efficiency and energy and unpredictability in the behaviour of machines and cycles.

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In this project, we will investigate non-standard thermodynamic systems, aiming at generalizing the four basic laws of thermodynamics in the light of these aspects, seeking applications in the context of black hole thermodynamics. Due to the presence of gravitational long-range interactions, black holes have non-trivial non-standard thermodynamic behaviour, and can illustrate some of the difficulties with non-ideal thermodynamics.

## Prof. Dr. Stefan Heinz

HWK Fellow  
Energy

### Fellowship

05/2018 - 07/2018

05/2019 - 08/2019

### Home institution

University of Wyoming  
Department of Mathematics  
Laramie, WY  
United States of America

### Cooperation partners

Prof. Dr. Joachim Peinke  
*ForWind - Zentrum für Windenergieforschung der  
Universitäten Oldenburg, Hannover und Bremen*

Prof. Dr. Ulrike Feudel  
*Institute for Chemistry and Biology of the Marine  
Environment (ICBM), University of Oldenburg*

Dr. Bernhard Stoevesandt  
*Fraunhofer Institute for Wind Energy Systems,  
Oldenburg*





## Understanding of Fluid-Boundary Interactions: A Unique Challenge

One of the most challenging and pressing problems of fluid dynamics is unsolved over decades: the sound physical explanation of how a fluid interacts with boundaries, first of all solid walls. There are serious consequences of this lack of understanding. The most important problem is that we are unable to use numerical simulation methods to really make predictions of realistic fluid flow problems, e.g., wind energy problems. All results need to be validated by observations. This is expensive and usually only partially doable. The main thrust of this project is to develop a theory of how a fluid interacts with walls and to demonstrate its benefits. This will be done as follows.

In collaboration with Prof. J. Peinke (ForWind, Oldenburg) and his research group, observations will be used to derive a model for the stochastic physics of wall-bounded turbulent flows. Together with Dr. B. Stoevesandt (Fraunhofer Institute for Wind Energy Systems, Oldenburg) and his group we will use this model for the design of hybrid turbulence models enabling accurate computational wind energy predictions that are currently infeasible. In addition to these project goals, we will prepare the use of our methods to solve corresponding marine and climate research problems. This will be done in collaboration with Prof. J. Wolff and Prof. U. Feudel (both ICBM, Oldenburg). Our stochastic modeling strategy to explain the dynamics of complex disordered systems can also be of interest for Neurosciences, Cognitive Sciences, and Social Sciences.

## **Prof. Dr. Irene Teresinha Santos Garcia**

HWK Fellow

*Energy*

### **Fellowship**

02/2018 - 11/2018

### **Home institution**

Universidade Federal do Rio Grande do Sul

Departamento de Fisico-Quimica

Porto Alegre

Brazil

### **Cooperation partner**

Prof. Dr. Katharina Al-Shamery

*University of Oldenburg*





## Tungsten Oxide Films Doped with Transition Metals (Nb, Cu, Rh, and Pd) for Solar Cell Applications

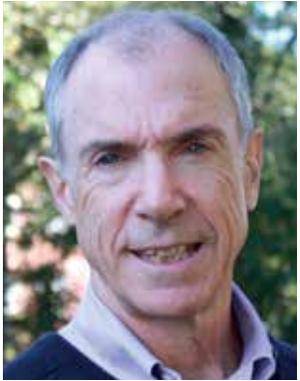
This is a proposal of interaction with researchers of the Carl von Ossietzky University of Oldenburg, looking for the joint research about tungsten oxides films doped with transition metals and their action in the hydrogen production and organic degradation using solar radiation. The proposal is to obtain these materials, known as photocatalysts, which are energy, chemical and time production efficient. Hydrogen is a clean combustible, once the product of its combustion is water. Actual photocatalysts present some disadvantages as they only use the radiation of the ultraviolet part of the electromagnetic spectrum, 7% of the radiation that strikes the earth surface. Tungsten oxide can be

excited with radiation in the visible part of the electromagnetic spectrum, which corresponds to 44% of the solar radiation. However, tungsten oxides in the pure form also present difficulties due to the fact that when excited, they present higher tendency to reduction instead of reducing hydrogen. This project aims at the development of methodologies to obtain tungsten oxide films with structures of higher surface area to better promote the surface reactions. I also propose to modify the structure of this oxide through the mixtures with other transition metals. The insertion of these metals aims to improve the photocatalytic yielding, the life time of the reactive species and to permit a better use of solar radiation.



# Society

## 2018



**Assoc. Prof. Dr. Ayten Alkan**

HWK Fellow – cofunded by EURIAS  
*Society*

**Fellowship**

08/2018 - 06/2019

**Location**

Ismir  
Turkey





## Revisiting 'Right to the City' from the Perspective of Non-Human: The Case of (Stray) Dogs

The ideal and discourse of the »rights-based thinking«, reinvented by the philosophers of the Enlightenment by revitalizing the antique »natural rights«, had created a convenient epistemological terrain to introduce also the non-human animals to this progressive and expansionist debate in the course of time. Since H.S. Salt's *Animals' Rights: Considered in Relation to Social Progress* (1894), the literature on the issue, albeit from different epistemological stand-points, has expanded and enriched. Academic and philosophical debate particularly revived by and after 1970s, following certain avant-garde works on speciesism.

Simultaneously, specific rights allocated to urbanity, which were finally categorized under third generation (solidarity-based) rights, would be a consequence of the embodiment and particularization of the »rights-based thinking« as per the city and urban life. They now are widely known as »urban rights« within a rather liberal context, and the »right to the city« from a critical and / or neo-Marxist approach.

However, until now, there has not been a theoretical effort to intertwine these two progressive debates of »animal rights« and the »right to the city«. This study is an attempt to bridge this gap from an interdisciplinary perspective. The specific focus of the research is »stray animals«, who tell silently the oldest story of co-habitation and co-adaptation between two species, yet in the end who have been structurally disregarded.

## Christophe Delory

HWK Fellow  
*Society*

### **Fellowship**

10/2018 - 01/2019

03/2019 - 06/2019

### **Location**

Argenton sur Creuse  
France





## U-Boot-Bunker Valentin - To Photograph the Absence

My topic at the HWK is to cast my eyes on the Valentin Bunker.

This bunker is in the suburb of Bremen, and was built between 1943 and 1945 by 12 000 workers: civilian forced laborers from Eastern and Western Europe, Soviet prisoners of war, Italian military internees, concentration camp prisoners and inmates of the labor re-education camps of the Bremen Gestapo. All of them were working under extreme pressure day and night.

This shipyard was supposed to produce one German U-boats submarine type XXI every two days when finished. Approximately 2,000 men died building it. In 2015 the bunker became the *Denkort Bunker Valentin*.

The purpose of this study is to reflect the connection between the bunker, the neighborhood and direct and indirect witnesses today.

The goal is to present the history with photos of the Bunker, and how people around Farge manage their lives, including portraits and interviews.

The subtitle »to photograph the absence« is to reflect the presence absence of workers and submarines, thus the tragic conclusion of a factory that was never put in use for what it was constructed (in March 1945, the settlement was completed to 90 % and most of the equipment installed. The production of U-Boots was to start within two months)

A study comparing with the shipyards in Brest or St Nazaire, or any other place in the world, is to be planned at the end of the stay.

## Prof. Dr. Kathryn Edwards

HWK Fellow  
*Society*

### **Fellowship**

07/2017 - 07/2018

### **Home institution**

University of South Carolina  
History Department  
Columbia, SC  
United States of America





## Living with Ghosts

Medieval and early modern Europe was filled with ghosts. They wafted through churchyards, sent household objects flying, and harassed residents of villages where they once lived. Treasure hunters depended on their insights, and nuns prayed for their salvation—and departure! *Living with Ghosts* tells the stories of such spirits, especially the belief in their existence, interests, and activities, during an era when Europeans were facing profound religious, social, political, and intellectual change. Drawing on over 2,000 accounts of hauntings from countries throughout Europe, it reveals for modern readers premodern attitudes to such revenants and embeds ghosts in a community of the living

and the dead. Fifteenth-century Europeans could accept a ghost's ability to offer legal testimony, a dearly departed father returning to advise his daughter, and an evening swapping tales with a disembodied spirit. During the debates of the Reformation and Enlightenment, however, ghosts' connections to European society became more fraught; those who saw spirits worried that they might be demons, and a sign of an appropriate education became skepticism, at least in public. *Living with Ghosts* thus allows readers to use ghosts as a means of understanding an era in European history that faced profound change and the debates over the natural, supernatural, and evidence that would transform European thought.

## **Prof. Dr. Piers Hale**

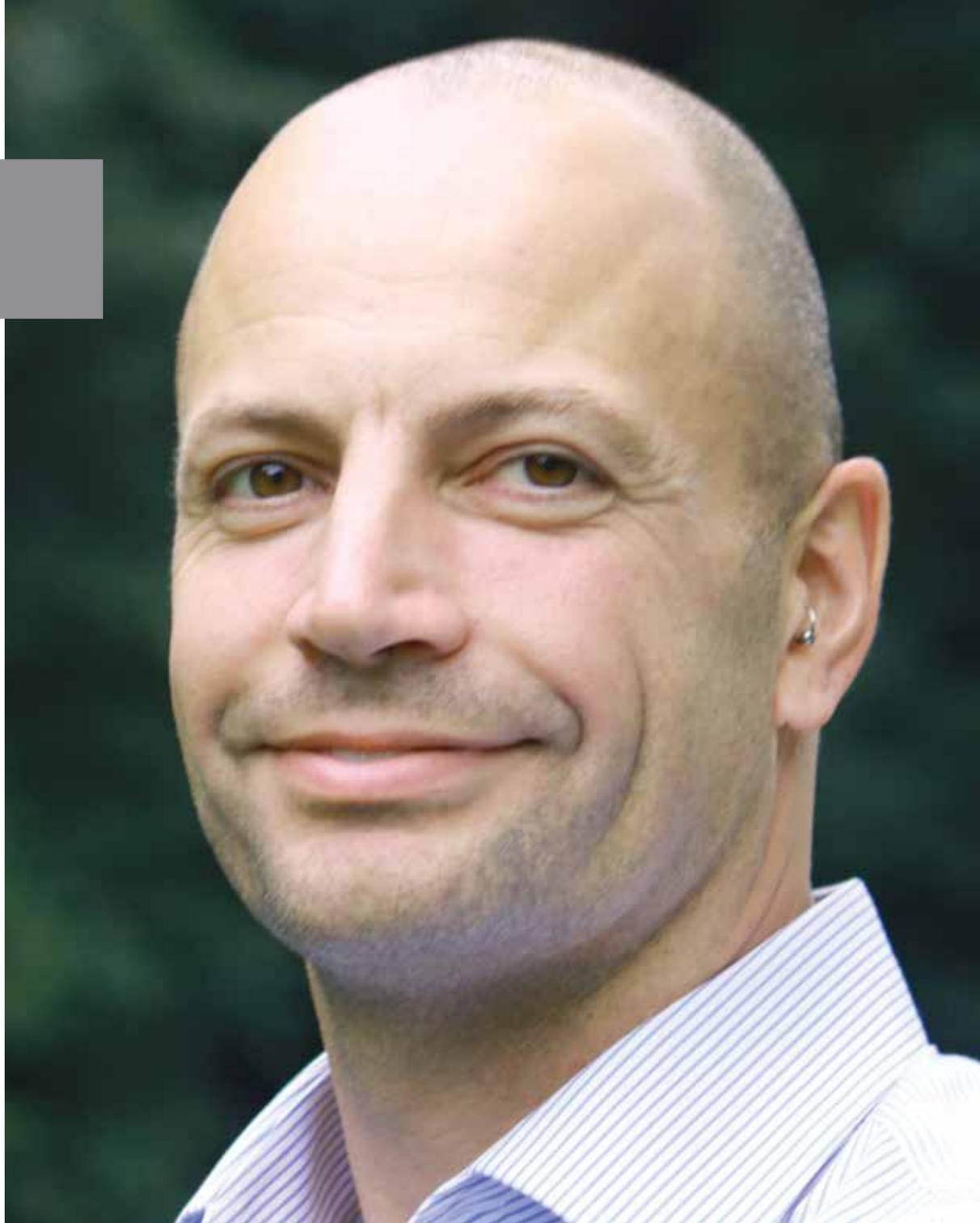
HWK Fellow – cofunded by EURIAS  
*Society*

### **Fellowship**

08/2017 - 06/2018

### **Home institution**

University of Oklahoma  
College of Arts and Sciences  
Department of History Science  
Norman, OK  
United States of America





## The Science of Man, Mind, and Morals in Victorian Britain

My project focuses upon the history of the science of mind and morals which in Britain came to prominence in the context of the mid-nineteenth century evolution debates. We can trace this genealogy of this debate from the early efforts of Franz Josef Gall to connect mind and brain, which flourished in England in the popular science of phrenology. Rejected by some as pseudoscience, Gall's findings, laid the foundation for later, more scientifically acceptable work by the likes of William Benjamin Carpenter. Carpenter's early work in physiology, published in the later 1830s, was controversial precisely because

he suggested that a science of mind was possible, and because he drew an antagonistic distinction between the conscious and subconscious mind. Anxious to present his work as quite compatible with Anglican theological orthodoxy, Carpenter also made every effort to show that his physiological work retained a place for free will and the human soul. While many historians have written this aspect of Carpenter's work off as indicative of a British obsession with natural theology, my research suggests that he was not alone in drawing from an earlier generation of German physiologists who grounded vital spirit in physiology rather than in religion.

**Prof. Dr. Ward Keeler**

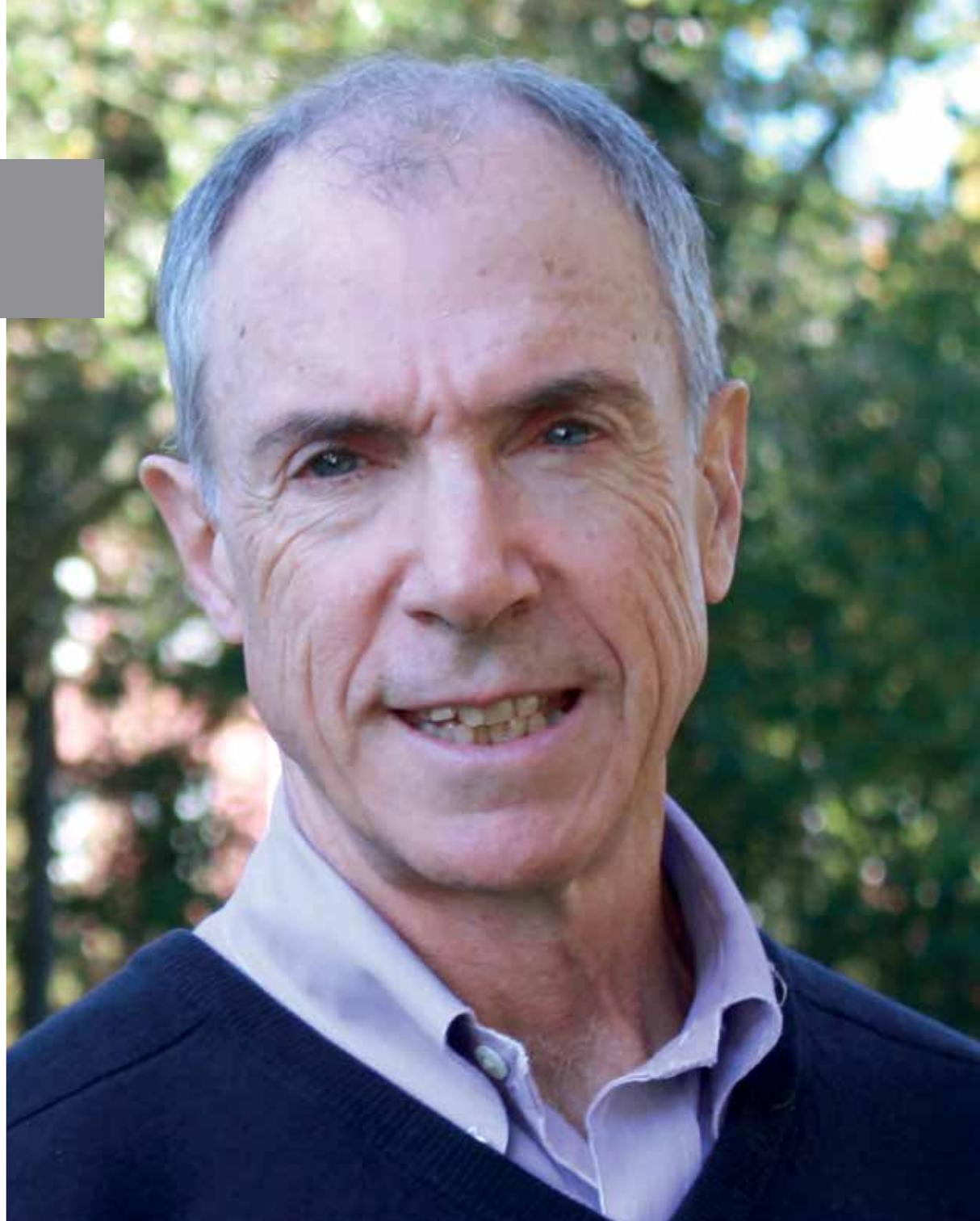
HWK Fellow  
*Society*

**Fellowship**

10/2018 - 07/2019

**Home institution**

The University of Texas at Austin  
Department of Anthropology  
Austin, TX  
United States of America





## The Aesthetics of Restraint in Tumultuous Times

I propose to write a book entitled *The Aesthetics of Restraint in Tumultuous Times* that analyzes developments in the performing arts in the three Southeast Asian societies (Java, Bali, and Burma) where I have done extensive fieldwork. In all three, the classical arts have suffered serious declines in popularity. My intention is to consider how these developments fit into the larger context of the many changes taking place in Southeast Asia today.

Classical genres in Southeast Asia reflect hierarchical concerns by focusing on style more than narrative, and on fostering emotional restraint rather than engagement. Aristocratic ideals favor physical and

emotional restraint in the arts because self-control—the ability to vanquish impulses—implies the ability to control not only the self but also others and indeed the world.

Hierarchical ideology has lost its persuasiveness for many Southeast Asians. Yet that has led only to a greater emphasis upon material wealth and reformist religious practices. Status concerns, still dominant, are now justified with reference to consumerist and spiritual modernity. These changes are reflected aesthetically in the rise in popularity of religious performances and of highly gendered, and simplifying, genres in which style matters little and melodramatic narratives come to the fore.

## Dr. Ailbhe Kenny

HWK Fellow – cofunded by EURIAS  
*Society*

### **Fellowship**

09/2017 - 06/2018

### **Home institution**

University of Limerick  
Mary Immaculate College  
Limerick  
Ireland





## The Musical Lives of Children of Asylum Seekers in Germany

There have been multiple legislative, political, academic, educational and media debates on the complex issues at stake for asylum seekers, particularly within Germany as the top destination country. One quarter of asylum seekers are currently children. Research in this field predominantly focuses on 'priority' areas such as food, accommodation and safety. As a consequence, the cultural needs and rights of asylum seekers have been largely ignored as well as the artistic experiences of children of asylum seekers. This project aims to gain an in-depth understanding of the role of music in the lives of children of asylum seekers (7-12 years) within a specific German context. Questions are asked about how, where, why and in what ways music is made individually and collaboratively amongst

these children. Novel approaches are taken to this qualitative case study where children's voices are prioritised. Participatory music workshops within asylum seeker reception centres capture data through arts-based methods, musical outputs and participant observation. Interviews and observations build on this participatory work to capture distinct and diverse childhood musical experiences. It is envisaged that policymakers, educationalists and academics will learn from the experiences of music examined to influence future directions in their respective fields. The project therefore addresses an urgent need to document and understand the musical values, knowledge and needs of these oft-unheard children in our society.

## Dr. Alessia Pannese

HWK Fellow  
*Society*

### **Fellowship**

03/2018 - 06/2018

09/2018 - 12/2018

### **Home institution**

University of Oxford

Faculty of History

Oxford

United Kingdom





## Physiology as Philosophy: A Comparative Study of Self-Regulation in Nineteenth-Century German Biophysics

Self-regulation is the capacity of a system to discern itself from the surrounding environment, and respond to external and internal conditions in appropriate ways. In humans and other living organisms, self-regulation is essential for survival because it enables maintaining a constant internal environment despite variability in the external world (e.g. the maintenance of a constant bodily temperature despite variation in outside temperature). A key feature of physiological self-regulation is that it functions automatically, without requiring conscious effort or even

awareness. During the nineteenth century, the automatic quality of self-regulation captured the interest of both physiologists and philosophers, as it suggested that living organisms are to some extent mechanical, and subjected to the same physical laws as the rest of nature. This project explores these physiological and philosophical perspectives on self-regulation, particularly in its mechanical and automatic aspects, as they arose within the nineteenth-century German medical and philosophical communities, and the European context in which they developed.

## **Assoc. Prof. Dr. Derek Pardue**

HWK Fellow – cofunded by EURIAS  
*Society*

### **Fellowship**

09/2017 - 06/2018

### **Home institution**

Aarhus University  
Department of Global Studies  
Aarhus  
Denmark





## African Immigration 'Boom' in Sao Paulo

The word 'boom' is dialectic in nature. It connotes both destructive explosions, a violence against society, and massive surges of creative production, as demonstrated in the famous Latin American 'boom' of literature inspired by García Márquez and 'magical realism.' In both senses, a temporality of the moment (boom) marks a human manipulation of space. An incursion, an expansion, or most pertinent in this case, an occupation. After the disastrous earthquake in Haiti in 2010, Brazil and its largest city, São Paulo, became a destination for not only Haitians but also tens of thousands of Senegalese, Congolese and other Central and West Africans. The visibility of these 'new' africanos has affected the city in terms of religion, residential demography, expressive culture and economic production. However, occupation and the making of place is frequently ephemeral.

During the 9 months of fieldwork conducted since 2016, I observed and was told repeatedly that immigrant actions, whether related to employment, political organization or the most basic rights of residency, are extremely dependent on relationships forged with Brazilians. Migrant occupations are thus highly contingent. My contribution to the growing scholarship and activism around immigration in Brazil is to articulate spatial presence to narrative experience. I believe that a focus on contingency may hold certain lessons about not only migrant lives and human rights but also our overall understanding of how cities operate and how, in effect, humans produce space. Contingency is also a keyword in my choice of representation. In this project, I blur genres of text to produce ethnographically informed fiction with the goal of creating dialogue between interpretations of migrant belonging and urban social theory.

## Assoc. Prof. Dr. Philipp Rehm

HWK Fellow – cofunded by EURIAS  
*Society*

### **Fellowship**

12/2018 - 06/2019

### **Home institution**

The Ohio State University, Columbus  
Department of Political Science  
Columbus, OH  
United States of America





## Lifting the Veil of Ignorance: Information and the Welfare State

One of the most important purposes of the welfare state is to provide insurance and it is well known that information critically shapes its provision. Yet, rather than playing the central role it warrants, information barely makes an appearance in the contemporary literature of welfare states in advanced industrialized countries. This is all the more surprising as we are living in an age of transformative changes in private insurance markets, spurred by the information revolution. These developments will reshape the politics of the welfare state, too.

There are two aspects of the information revolution that are consequential for welfare state politics. First, more information deepens the redistributive conflict of social insurance because it more clearly cleaves winners and losers. Second, the increased ability to share information allows for accurate individual risk assessments. This solves the adverse selection problem, a key obstacle for private insurance markets, making such markets potentially feasible and attractive to »good risks« currently covered by mandatory public programs that subsidize »bad risks«. This would undermine the broad support welfare states historically enjoy. In my proposed project I want to explore the relationship between »Information and the Welfare State« theoretically and empirically in order to understand the challenges ahead.

## **Prof. Dr. Melanie Tanielian**

HWK Fellow – cofunded by EURIAS  
*Society*

### **Fellowship**

09/2018 - 06/2019

### **Home institution**

University of Michigan  
Department of History and International  
and Comparative Studies  
Ann Arbor, MI  
United States of America





»HUNGERTOD!«

## The History of »Civilian Insane« During World War I

»HUNGERTOD!« From 1914 to 1920, around the globe, the death rate of civilians in mental health institutions was truly staggering. During these six years, 70,000 civilians died in Germany's psychiatric hospitals of starvation and malnutrition. In Britain, the death rate of civilians in »insane asylums« rose to twenty percent in one year, 1918. Examining the socioeconomic, cultural, and legal contexts, this project interrogates the treatment of so-called civilian lunatics in Germany and Great Britain and their respective allies the Ottoman Empire and the United States during World War I.

Through archival work and comparative analysis of psychiatric hospitals and the treatment of their patients in times of crisis, this project sheds light on inequitable national policies of entitlements based on civilians' positionality in the hierarchy of citizenship. Therein, the project contributes to an increasingly global history of World War I while paying close attention to local contexts.

**Asst. Prof. Dr. Inés Valdez**

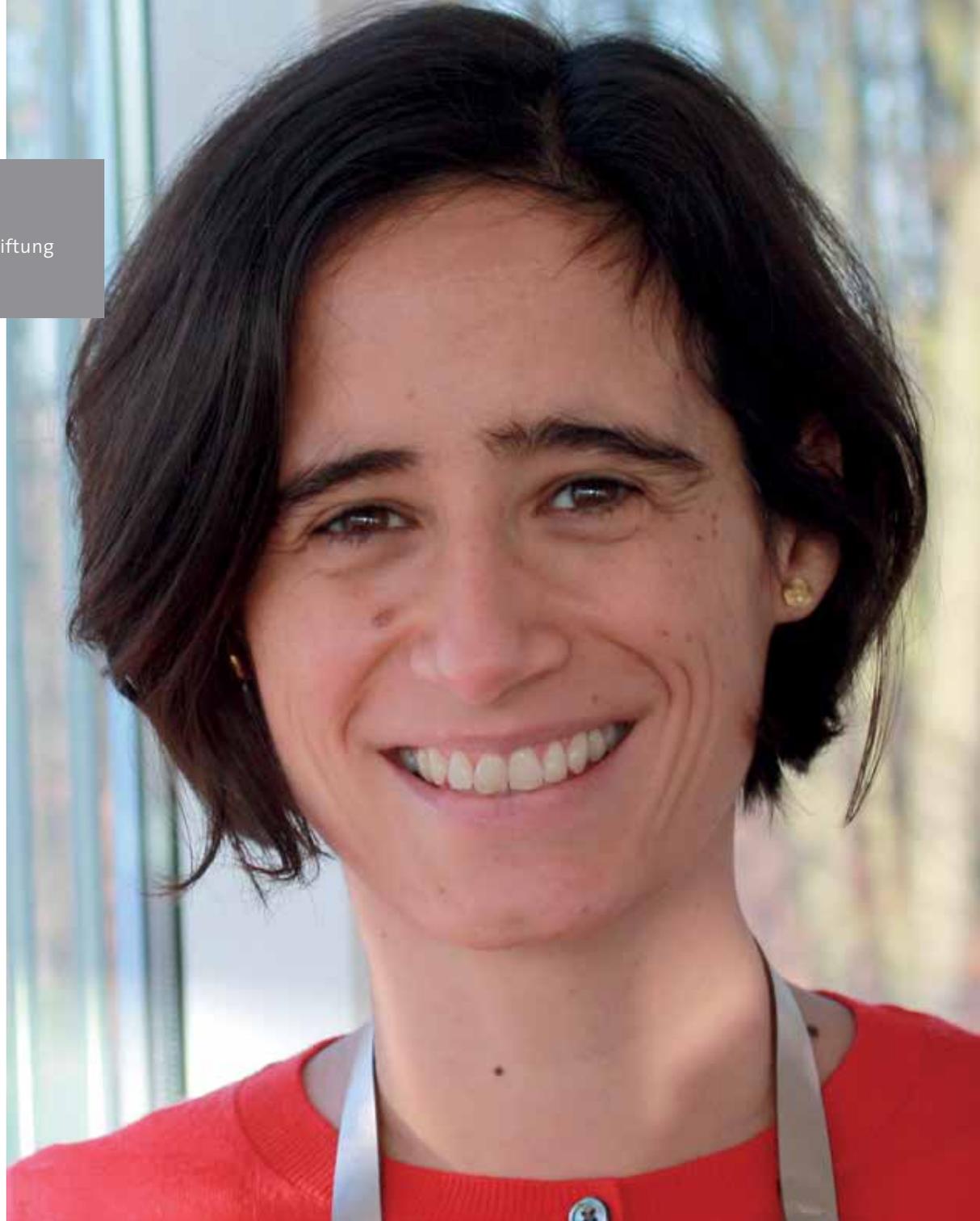
HWK Fellow – cofunded by Alexander von Humboldt-Stiftung  
*Society*

**Fellowship**

12/2018 - 07/2019

**Home institution**

Ohio State University, Columbus  
Department of Political Science  
Columbus, OH  
United States of America





## Kant, Du Bois, and Cosmopolitanism in a New Colour

The literature on cosmopolitanism—roughly defined as the idea that all human beings belong to a single political community so that certain responsibilities apply beyond national borders—has enjoyed a resurgence in the last three decades. This is likely due to the increasingly interconnected character of human social, political, and economic relations and the questions of justice that inevitably emerge. Given the contemporary concerns of this literature, it might sound odd that Immanuel Kant’s late eighteenth century cosmopolitanism is one of the most influential framings for this tradition. My book project, *Cosmopolitanism in a New Color*, examines critically this predominance and argue that a more thorough examination

of Kant’s thought is necessary to assess its ability to inform our thinking today. Through a novel historical reading I show that one of Kant’s cosmopolitanism prime motivations was to guarantee peace in Europe, thus making his framework ill equipped to cope with the challenges that a highly unequal world poses. While I retain certain Kantian insights, I complement them with the intellectual resources of W. E. B. Du Bois, a black American intellectual that wrote in the first half of the twentieth century, opposing colonialism and connecting racial domination within the United States to that of the colonies. This focus on transnational domination, and unequal access to sovereignty is a valuable resource to think through contemporary challenges.



2018

# Arts and



# Literature

## Dorothee Albrecht

Artist in Residence  
*Arts and Literature*

### **Fellowship**

01/2018 - 03/2018

### **Location**

Berlin  
Germany





## Tea Pavilion – Dwelling on the Contemporary Globe – Starting with Hannah Arendt

Der Tee als Getränk und als Metapher vermittelt zwischen tausendjähriger Teekultur, Kolonialgeschichte und der sozialisierenden Tasse Tee, die entspannt in zivilen Räumen getrunken wird. Differenzen und Gemeinsamkeiten werden in ein Spannungsfeld gebracht, während durch die wechselnden Blickwinkel, die eingenommen werden, der Raum des »Tea Pavilion« immer wieder neu befragt und produziert wird. Ein Pavillon erscheint in Zeiten weltweiter Veränderungen als adäquater Möglichkeitsraum: flexibel und beweglich genug, um auf die veränderlichen Bedürfnisse an einem Ort reagieren zu können.

Dorothee Albrechts Kunstprojekte beschäftigen sich mit experimentellen Untersuchungen und der Verwirklichung von

Räumen: bewegliche Räume, geschichtete, heterotopische Räume oder Räume analog zu Hannah Arendts Konzept öffentlicher Räume als »gleichzeitige Anwesenheit zahlloser Aspekte und Perspektiven, in denen ein Gemeinsames sich präsentiert«.

Der zweite Teil des Projekts »Tea Pavilion – Dwelling on the Contemporary Globe – Starting with Hannah Arendt « geht von Dokumenten des Hannah Arendt Archivs der Oldenburger Universität aus und verbindet historische und aktuelle Momente mit übergreifenden Fragen nach Exil, Fremdheit, Individualisierung und dem sich Einrichten in einer globalisierten Welt. Von Februar bis Ende März 2018 entsteht eine Text-Bild-Video-Assemblage, eine Art Wörterbuch im Raum, ein Ort, der benutzt werden kann und auch zum Teetrinken einlädt.

## Nadia Petra Lichtig

Artist in Residence  
*Arts and Literature*

### **Fellowship**

09/2018 - 12/2018

### **Location**

Montpellier  
France





## Memory Gardens

Nadia Lichtig lebt und arbeitet in Montpellier. Sie verfolgt eine künstlerische Praxis, in der Arbeitsprozess, Erinnerungen und poetische Erfahrung Arbeitsmaterialien von identischer Bedeutung sind. Ihre Installationen kreieren neuartige Verbindungen zwischen disparaten Elementen wie Stimme, Zeichnung, Malerei und Digitaldruck, wobei jedes dieser Elemente sukzessiver Transformation unterworfen wird: Gefundene Worte werden Zeichnung, Photographie, Duft; sie werden Markierung, Gemälde, Digitaldruck oder Text in Vinyl graviert .... Diese Modifizierungen und deren Koexistenzen resultieren in der Ambivalenz, die Nadia Lichtigs Schaffen auszeichnet und den Betrachter einlädt, permanent neu zu fokussieren, den eigenen Blickwinkel neu zu justieren.

## **Prof. Dr. Robert Mitchell**

HWK Fellow

*Arts and Literature, project »Fiction Meets Science«*

### **Fellowship**

06/2018 - 07/2018

### **Home institution**

Duke University, Durham  
Department of English  
Center for Interdisciplinary Studies  
in Science and Cultural Theory  
Durham, NC  
United States of America

### **Cooperation partner**

Prof. Dr. Anton Kirchhofer  
*University of Oldenburg*





## Nineteenth-Century British Novels, Liberalism, and the Biopolitical Sciences of Population

This project focuses on relationships between 19th-century British novels and the sciences of population that first appeared alongside these literary texts. 19th-century novels and the sciences of population had a surprisingly intimate relationship: Mary Shelley's *Frankenstein* (1818), for example, was written partly in response to Thomas Malthus's *An Essay on the Principle of Population* (1798), itself an attack on the political philosophy of Mary Shelley's father, William Godwin. The topic of population is central to the novel's plot – Victor Frankenstein fears that creating a second creature could spawn a population of creatures that would destroy humankind – and the strange plot of *Frankenstein* encouraged its first reviewers to reflect on different »species« (what we now call genres) into which 19th-century novels were differentiating themselves.

Relationships between population and novels were not limited to *Frankenstein*, for the characteristically huge populations of characters in the »realist« novels of authors such as Dickens and Eliot emerged in part in response to the increasing importance of population statistics. This project explores both how 19th-century British literature mediated the sciences of population for wider audiences, and how the sciences of population encouraged the development of literary techniques we now consider essential to this literary form (e.g., large populations of characters; free indirect discourse; segmentation of the book market by genre).

## Judith Neunhäuserer

Artist in Residence

*Arts and Literature, project »Expedition Science and Art«*

### **Fellowship**

10/2017 - 04/2018

### **Location**

Munich

Germany

### **Cooperation partner**

Kinga Jarzynka

*Alfred Wegener Institute,*

*Helmholtz Centre for Polar and Marine*

*Research (AWI), Bremerhaven*





## Polar Research Rituals - An Artistic Reconstruction of Scientific Processes

Modelle von und für Welt nachzuvollziehen und in ihren Formensprachen aufzugreifen, ist ein zentrales Anliegen der Kunst von Judith Neunhäuserer. Dabei interessieren sie vor allem formale Überschneidungen unterschiedlicher Bereiche, die in ihrer gesellschaftlichen Ausdifferenzierung zunächst vielleicht sogar gegensätzlich scheinen. Ihr Projekt im Rahmen der »Expedition Wissenschaft und Kunst«, einer Kooperation zwischen HWK und AWI, basiert auf der Annahme, dass heute Naturwissenschaften das Instrumentarium zur Welterklärung bereitstellen. Die auf der Neumayer Station III in der Antarktis stattfindenden Forschungsvorgänge bilden den Fundus, dem einzelne skulpturale Elemente für eine raumgreifende Installation entnommen werden. Diese trägt ritualhaften Charakter und soll zum Setting für eine entsprechende, performativ ausgeführte Handlung werden. Bei der Expedition in Kooperation mit dem Alfred-

Wegener-Institut werden die Arbeit der Wissenschaftlerinnen und Wissenschaftler, routinierte Abläufe, verwendete Geräte und alltägliche Umgebung, beobachtet und daraus Gegenstände, Materialien und Tätigkeitsmuster extrahiert. Im Ausstellungsraum kehren sie in einer Mischung aus Imitation und Verfremdung wieder: So würde ein Regal voll gläserner Eisbohrkerne auf deren archivarische Funktion verweisen, ein Wetterballon seine Botschaft bei jedem Atemzug entfalten. Eine Orientierungsleine könnte zur Kunst hinführen oder ringförmige Leuchtstoffröhren Halo-Effekte im Auge der Betrachterin oder des Betrachters erzeugen. Außerdem entsteht eine Publikation, die in der Tradition klassischer Logbücher einen Erlebnisbericht enthält, der aber, um fiktionale Passagen ergänzt, seine Leserschaft im Unklaren lässt über tatsächliche und imaginierte Erfahrungen der Antarktis.

## Lilian Elisa Robl

Artist in Residence  
*Arts and Literature*

### **Fellowship**

09/2017 - 01/2018

### **Location**

Munich  
Germany





## Wissen als Bild. Diagramme in Kunst und Wissenschaft

In den letzten Jahren hat das wissenschaftliche Interesse an Diagrammen massiv zugenommen. Trotzdem fehlt der noch jungen Disziplin der »Diagrammatik« der eigene Ort im akademischen Diskurs, da sie sich fluide zwischen Fächergrenzen bewegt. Das Diagramm lässt sich an der Schnittstelle zwischen wissenschaftlichem und künstlerischem Denken verorten, als theoretisches wie auch als praktisches, benutzbares Instrument: Nicht nur sind Reflexionsprozesse visuell und räumlich strukturiert, Diagramme können zudem etwas sichtbar machen, was vorher auf diese Weise nicht vermittelbar war. Das Diagramm ist eine Form der Visualisierung und damit Erkenntnisinstrument, kartografisches Ordnungsmuster, Experimentierfeld und ästhetisches Objekt.

In meiner künstlerischen Vorgehensweise begreife ich Diagramme nicht nur als zielgerichtete Instrumente – als retrospektives Hilfsmittel zur Veranschaulichung und Systematisierung, sondern auch als auflösungsorientiert, als grundsätzlich instabil oder fließend: Im Vordergrund steht hier das Prozesshafte, Ungelöste oder Zufällige, das mit jener ersten ökonomischen Absicht in Konflikt geraten kann. Auf diese Weise werden Diagramme als scheinbar objektive Repräsentationsform in Frage gestellt und Möglichkeiten der Kontingenz durchgespielt. Obwohl ich mich der Form des Diagramms bediene, versuche ich gleichzeitig, das Diagramm nicht nur rein affirmativ zu nutzen, sondern seine »objektive« Funktion zu hinterfragen und dadurch zu destabilisieren.

## **Assoc. Prof. Dr. Edward Schwarzschild**

Writer in Residence

*Arts and Literature, project »Fiction Meets Science«*

### **Fellowship**

07/2018

### **Location**

University of Albany

Albany, NY

United States of America

### **Cooperation partner**

Susan M. Gaines

*University of Bremen*





## The Schwarzschild Radius: A Novel

My novel-in-progress, *The Schwarzschild Radius*, is inspired by Karl Schwarzschild (1873-1916), the German astronomer most famous for figuring out the first exact solution to the Einstein field equations of general relativity in 1915. His work has led to many original concepts that now bear his name including: Schwarzschild coordinates, the Schwarzschild metric, the Schwarzschild radius, the Schwarzschild singularity, Schwarzschild black holes and Schwarzschild wormholes.

After completing an assignment to write a few paragraphs to commemorate the 100th anniversary of Schwarzschild's death in 2016, my novel's central character, Jake Strosser, grows increasingly obsessed with Schwarzschild's life and work. He wonders, for instance, why Einstein both praised and criticized

Schwarzschild, at one moment asserting that »among the living there remain probably only a few who know how to apply mathematics with such virtuosity as he did« and, at another moment, suggesting that Schwarzschild »would have been a gem, had he been as decent as he was clever«. He wonders about the contours of Schwarzschild's marriage to a non-Jew. He wonders about Schwarzschild's decision, at age 40, to leave behind his young family and prestigious position (director of the Potsdam Observatory) to volunteer for service in the army in World War One. As Jake's deepening obsession begins to cause trouble in his own family, he encounters a man who claims to be Schwarzschild's grandson, the offspring of an affair Schwarzschild had while serving on the Russian front. Is this »grandson« a con artist or a genuine relative? The attempt

to unravel this mystery of relativity not only leads Jake further into Schwarzschild's work, but also puts his whole family in danger.

The ongoing research necessary for this novel continues to be fascinating. It is research that would have been almost impossible without the assistance and support of the Fiction Meets Science Program. I have benefitted immensely from conversations with scientists associated with the Fiction Meets Science Program. In addition, with the crucial help of the HWK, I've been able to spend time meeting with experts at observatories in Göttingen and Potsdam. I'm looking forward to returning to those places as well as exploring other locations central to Schwarzschild's life and work.

## Dr. Jaspreet Singh

Writer in Residence

*Arts and Literature, project »Fiction Meets Science«*

### **Fellowship**

09/2017 - 05/2018

### **Home institution**

University of Alberta,  
Department of English and Film Studies  
Edmonton  
Canada

### **Cooperation partner**

Susan M. Gaines  
*University of Bremen*





## Be2ing

I will work on my new book — Be2ing, a collection of short stories which will investigate the figure of a scientist as a migrant. Mass migration has become one of the defining features of our times. Growing conflicts over resources, climate change, and ‘Anthropocene’ have already started to influence human movement and survival in unprecedented ways. Histories of science are filled with narratives of voluntary and involuntary movements. What role does migration play in the work of scientists?

How do such figures navigate the power structures of their times? I would like to investigate the consciousness, the inner lives of such figures. Hopes, obsessions, fears, dreams, shame and guilt. Small and large conflicts. Difficult moments of choice. Consequences of work. Moral complexity. What is remembered, and what is forgotten by individuals and collectives? What creative ways are we to use to restore and resurrect those marginalized by history? Currently, in what ways do the scientists themselves address the problem of mass-migration(s)? How do they frame the ‘problem’? How do they break it into smaller parts?

## Bettina Thierig

Artist in Residence  
*Arts and Literature*

### **Fellowship**

07/2018 - 08/2018

### **Location**

Lübeck  
Germany





## Bees and Honeycombs

Bees have been in contact with mankind since nearly forever. There are traces that bees are being used in Germany since 7300 years ago and in other parts of the world since 9000 years ago. Today insects are vanishing and so are the bees.

The effects of their vanishing give us a hint that we are much more dependent of nature than we would like to be. This again evokes ambivalent sentiments.

I would like to examine the theme »Bees and Honeycombs« in different ways. In my sculptural work I already started to combine traditional materials for the sculpturing process such as clay, plaster and stone with organic material, like wax, wool and horn.

I want to take these combinations further and integrate them in my work with the theme »Bees and Honeycombs«. Furthermore I would like to use my stay at the HWK to intensify the literature research, making a new collage and also work on my own writing.

## Dr. Padma Venkatraman

Writer in Residence

*Arts and Literature, project »Fiction Meets Science«*

### **Fellowship**

06/2018 - 07/2018

12/2018 - 01/2019

07/2019 - 09/2019

### **Location**

Narragansett, RI

United States of America





## Ocean Crossings

In this semi-autobiographical novel, vignettes that explore aspects of oceanography are intermeshed with the story of a young Indian immigrant in the United States who is an oceanographer. When she is called away to attend her mother's funeral, she is forced, not only to literally fly across the ocean but also to face other oceanic divides that she is crossing: gender gaps, racial prejudices and culture clashes. In parallel, and in preparation for the novel, I am also writing a series of loosely connected essays that form a memoir of my experience at HWK and are inspired by questions that explore how certain voices have been suppressed both in terms of the literature and science of the oceans. For example: How does culture shape science?

What assumptions about gender, race, ethnicity, etc. shape our attitudes toward scientific progress and how do they inform our narrative of the history of science? In what ways do our paradigms of scientific history, notions of feminism and cultural frameworks shape the language we use to communicate scientific thought? How is one's personal history informed by social, historical and cultural contexts, and when do such contexts intersect? How have these forces informed the study of literature related to and inspired by the oceans? What voices and viewpoints remain underrepresented, understudied, or unrecognized in marine-themed literary collections and our narratives of the history of ocean science?

2019

**Future Fellows**



- a selection

**Asst. Prof. Dr. Hedda Rahel Schmidtke**

HWK Fellow

*Brain*

**Fellowship**

09/2019 - 05/2020

**Home institution**

University of Oregon

Eugene, OR

United States of America

**Cooperation partner**

Prof. Dr. Dagmar Borchers,

Prof. Dr. Christian Freksa

*University of Bremen*





## Foundations of Higher Cognition with Applications to the Trolley Problem in Autonomous Vehicles

With several accidents caused by semi-autonomous vehicles in the US, artificial intelligence may once again become subject to public debate, and we want to ensure that these powerful systems as we increasingly trust them with our lives will act ethically in a human sense. Asimov's robot laws, e.g., may seem to be a good choice, but there is a problem. Our most powerful systems, today, have a very rudimentary understanding of the world, much like an animal, which is far away from understanding dos and don'ts. To go from that stage to being able to receive and transfer abstract knowledge to other agents, is one of the key abilities of human beings no other animal developed. Building upon a previous cognitive system, enabled to understand and picture spatial, temporal,

and also other similar relations given in a quasi-natural language format, this project will go one step further. We will implement a simple ethical coordinate system, at the boundary between human and animal intelligence, and test it on a widely debated problem, the so-called trolley dilemma: imagine a trolley is running down a railway track onto which a group of people has been tied; you are standing at a switch and could redirect the trolley to a side track, where only a single person is tied to the tracks; would you pull the lever? The answer people give varies depending on ethical, spatial, temporal, and social factors. A trustworthy AI would be one that has a similar »gut feeling« as we do.

## Dr. Beth N. Orcutt

HWK Fellow  
*Earth*

### **Fellowship**

11/2019 - 02/2020

### **Home institution**

Bigelow Laboratory for Ocean Sciences  
East Boothbay, ME  
United States of America

### **Cooperation partners**

Prof. Dr. Wolfgang Bach,  
Prof. Dr. Kai-Uwe Hinrichs  
*MARUM – Center for Marine Environmental  
Sciences, University of Bremen*





## Microbe-Mineral Interactions in Subsurface Oceanic Crust

Underneath the ocean, roughly 70% of the Earth's surface is covered by marine sediments and oceanic crust. Microscopic life – »microbes« like bacteria and archaea – exist in this dark, deep-sea environment, cycling elements and eating carbon. Below the seafloor, there is a vast reservoir of life on Earth, yet we don't fully understand how all of the microbes get their energy to grow, the full impact of their activity on chemical cycling, and even how many microbes there are. In particular, knowledge of the extent, diversity, and function of life in the sub-seafloor rocky oceanic crust is poorly understood.

For the past several years, I have been conducting novel sampling and incubation experiments within the sub-seafloor to examine how microbes interact with rocks. For this HWK project, I will collaborate with scientists at the University of Bremen to examine the change in mineral chemistry associated with microbial growth, to figure out which rock types microbes prefer to colonize, and how they may alter the rocks that they grow on. I will also work with these scientists to determine the amount and types of microbial life colonizing these rocks, to figure how much life can be supported by these fluid-rock interactions. Ultimately, these analyses will help us to figure out which microbes are »rusting the crust« of Earth and inform us of the possibility for life to exist on other planets with liquid water and crustal rocks.

**Prof. Dr. Kyle V. Camarda**

HWK Fellow

*Energy*

**Fellowship**

02/2019 - 07/2019

**Home institution**

Chemical and Petroleum Engineering Department

The University of Kansas

Lawrence, KS

United States of America

**Cooperation partner**

Prof. Dr. Edwin Zondervan

*University of Bremen*





## Multiobjective Optimization of Global-Scale Energy Infrastructures

Perhaps the most pressing issue facing today's society is the problem of the provision of energy. Demand for energy is rising, yet the use of fossil fuels threatens catastrophic climate change. This project seeks to apply modern techniques in process systems engineering to the problem of redesigning power grids, to fully utilize renewable sources while still providing the needed energy to power the world. The problem of selecting locations, types and sizes of renewable power plants and energy storage equipment is a very large problem which includes thousands of decision variables. Since many of the equations involved are also highly nonlinear, and often involve uncertainty, traditional optimization techniques are often ineffective. New algorithms, known

as stochastic because they involve a random search function, are particularly suited to these complex nonlinear optimization problems. They are able to define the trade-offs between various objectives, and allow many scenarios to be evaluated quickly and efficiently. Models for energy production and distribution systems already developed in Prof. Zondervan's group at the University of Bremen will be enhanced to include uncertainty in demands and production capabilities. These more complex models will then be solved using those stochastic algorithms on parallel computing hardware. Our results will guide governments and regulatory agencies on how to best operate energy grids for minimum environmental impact.

## Prof. Dr. Semion Lyandres

HWK Fellow  
Society

### Fellowship

01/2019 - 11/2019

### Home institution

University of Notre Dame  
Department of History  
Notre Dame, IN  
United States of America





## The February Days, 1917: The Downfall of the Old Regime and the Politics of Russia's Failed Attempt at Democracy

The Russian Revolution of February 1917 was a defining event of the twentieth-century. In nine short days, the centuries-old tsarist regime was overthrown, and a chain of events was set in motion that led to the disintegration of the Russian empire and the rise of the Soviet regime that would come to dominate the world stage. The February Revolution also constitutes one of the most exciting, innovative, and formative events in all of Russian history. The lessons of the revolution transcend the year of 1917, since many of the institutions, practices, and attitudes it introduced lasted

through much of the Soviet period, with ramifications until the present day. The proposed book will rely on a wide range of previously unavailable archival sources to explore how pre-revolutionary ideas shaped revolutionary politics in February 1917 and defined the form and composition of the Russian Provisional Government. More broadly, the book will focus on ideas and elite politics to explain Russia's failed transition to democracy in 1917, with global implications for modern and contemporary revolutions, including Eastern Europe and the Arab Spring.

## Assoc. Prof. Dr. Catherine Bush

Writer in Residence

*Arts and Literature, project »Fiction Meets Science«*

### **Fellowship**

02/2019 - 04/2019

### **Home institution**

Creative Writing MFA  
School of English and Theatre Studies  
University of Guelph  
Canada

### **Cooperation partner**

Susan M. Gaines  
*University of Bremen*





## Elemental

My current project, *Elemental*, my fifth novel, takes the premise of Shakespeare's late play *The Tempest* and reworks it in a contemporary setting, reconfiguring the central figure of Prospero, magician and the deposed Duke of Milan, as a renowned climate scientist, who loses his academic position after having his email account hacked and contents of his emails twisted by climate change deniers, who claim he and his colleagues are fudging their data to show warming. His situation draws upon that of actual scientists similarly set upon in the lead-up to the Copenhagen Climate

Summit of 2009. He flees with his daughter to a small island in the north Atlantic, a fictionalizing of the actual Fogo Island off the northeast coast of Newfoundland. While he attempts to escape the perils of the larger world, word reaches him of an ice-free summer North Pole. Fear and despair propel him to consider solar radiation management as a realistic course of action, as perilous as it may be, given its unknowns and its assumptions that we can technologically control the atmosphere, in order to leave as livable a world as possible to his daughter.

## Nadine Ribault

Artist in Residence  
*Arts and Literature*

### Fellowship

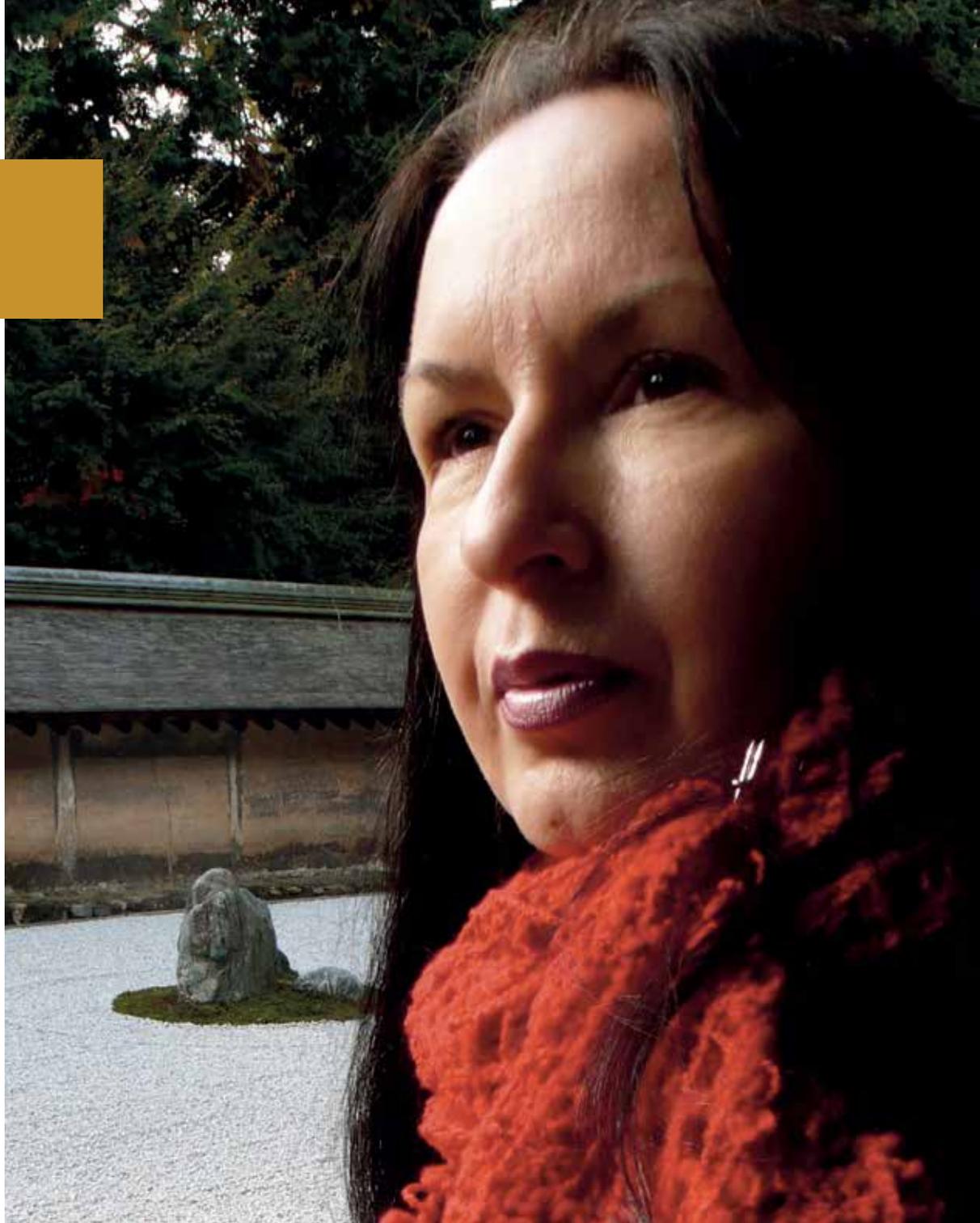
03/2019 - 05/2019

08/2019 - 10/2019

### Location

Condette

France





## The Haunting Symphony of Desire

During my stay at HWK, I would like to work on the essential link between Desire and Nature. My thesis is that the predominant ideology of domination of Nature we are living in leads to the vanishing of Desire.

On the contrary, the visitation and the development of acquaintances with a Nature where the industrial impact is reduced as much as possible (which is already almost impossible) feeds and sustains a strong and deep desire inside Human Being.

I propose to search for materials, journals, magazines, photographs and gather them to find a way towards interesting *series* of collages. Preliminary thematic titles of such series could be: »Tombs«, »Cemeteries«, »Ruins«, »Birds«, »Coastal heathland«, »Moorlands«. My aim would be also to make

drawings. Mobilizing inks, pastels, felt pen, charcoal, and colored pencils, I would draw a series of about thirty works based on a selection of citations from Novalis's work.

I would have short visits toward the coast (Friesland, Wattenmeer, Helgoland), to prepare the writing of a new Carnet in my already published series of Carnets, entitled Carnets de la Mer des Wadden. I will focus my work on the link between this very distinctive landscape and the conditions of existence or of non-existence of Desire. My Carnets are always dealing with the ecological question and how Human Beings still need a powerful link with Nature in order to preserve their creativity and to nourish their internal movement and drifting.



## Impressum

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