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May 9, 2017

### **Final report ONRG grant number N62909-16-1-2229**

Dear Sir or Madam,

For final processing of the ONRG grant with the above mentioned number obtained by the principal investigator Prof. Dr. Wendisch for the symposium entitled "CSP – Hyperspectral Imaging and Sounding of the Environment Meeting Scholarship Fund" you will find hereby the Federal Financial Report SF425 and the Final Technical Report with cover form SF298.

Please, do not hesitate to contact me if you have any questions.

Sincerely,



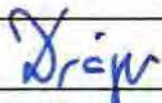
Dr. Barbara Weiner

Attachments



# FEDERAL FINANCIAL REPORT

(Follow form instructions)

1. Federal Agency and Organizational Element to Which Report is Submitted <b>Office of Naval Research Global S&amp;T Programs Administrator</b>		2. Federal Grant or Other Identifying Number Assigned by Federal Agency (To report multiple grants, use FFR Attachment) <b>N62909 - 16 - 1 - 2229</b>		Page <b>1</b>	of <b>2</b>																																
3. Recipient Organization (Name and complete address including Zip code) <b>Leipzig University, Ritterstr. 26, D-04109 Leipzig, Germany</b>																																					
4a. DUNS Number  <b>330187378</b>	4b. EIN  <b>44-4444444</b>	5. Recipient Account Number or Identifying Number (To report multiple grants, use FFR Attachment)  <b>232101142</b>	6. Report Type <input type="checkbox"/> Quarterly <input type="checkbox"/> Semi-Annual <input type="checkbox"/> Annual <input checked="" type="checkbox"/> Final	7. Basis of Accounting  <input checked="" type="checkbox"/> Cash <input type="checkbox"/> Accrual																																	
8. Project/Grant Period From: (Month, Day, Year) <b>09/30/2016</b>		To: (Month, Day, Year) <b>12/31/2016</b>		9. Reporting Period End Date (Month, Day, Year) <b>12/31/2016</b>																																	
10. Transactions				Cumulative																																	
(Use lines a-c for single or multiple grant reporting)																																					
Federal Cash (To report multiple grants, also use FFR Attachment):																																					
a. Cash Receipts				19200.00																																	
b. Cash Disbursements				19918.58																																	
c. Cash on Hand (line a minus b)				0																																	
(Use lines d-o for single grant reporting)																																					
Federal Expenditures and Unobligated Balance:																																					
d. Total Federal funds authorized				19200.00																																	
e. Federal share of expenditures				19200.00																																	
f. Federal share of unliquidated obligations				0																																	
g. Total Federal share (sum of lines e and f)				19200.00																																	
h. Unobligated balance of Federal funds (line d minus g)				0																																	
Recipient Share:																																					
i. Total recipient share required				11																																	
j. Recipient share of expenditures				11																																	
k. Remaining recipient share to be provided (line i minus j)				11																																	
Program Income:																																					
l. Total Federal program income earned				11																																	
m. Program income expended in accordance with the deduction alternative				11																																	
n. Program income expended in accordance with the addition alternative				11																																	
o. Unexpended program income (line l minus line m or line n)				11																																	
<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <th style="width:10%;">11. Indirect Expense</th> <th style="width:10%;">a. Type</th> <th style="width:10%;">b. Rate</th> <th style="width:10%;">c. Period From</th> <th style="width:10%;">Period To</th> <th style="width:10%;">d. Base</th> <th style="width:10%;">e. Amount Charged</th> <th style="width:10%;">f. Federal Share</th> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td colspan="5"></td> <td style="text-align: right;">g. Totals:</td> <td></td> <td></td> </tr> </table>						11. Indirect Expense	a. Type	b. Rate	c. Period From	Period To	d. Base	e. Amount Charged	f. Federal Share																						g. Totals:		
11. Indirect Expense	a. Type	b. Rate	c. Period From	Period To	d. Base	e. Amount Charged	f. Federal Share																														
					g. Totals:																																
12. Remarks: Attach any explanations deemed necessary or information required by Federal sponsoring agency in compliance with governing legislation: <b>Breakdown of costs is attached, costs for HISE 2018 meeting were approved by ONRG</b>																																					
13. Certification: By signing this report, I certify that it is true, complete, and accurate to the best of my knowledge. I am aware that any false, fictitious, or fraudulent information may subject me to criminal, civil, or administrative penalties. (U.S. Code, Title 18, Section 1001)																																					
a. Typed or Printed Name and Title of Authorized Certifying Official  <b>Prof. Dr. Birgit Dräger, Head of Administration and Finance</b>				c. Telephone (Area code, number and extension) <b>+49 341 97 30100</b>																																	
b. Signature of Authorized Certifying Official  				d. Email address <b>kanzlerin@zu.uni-leipzig.de</b>																																	
e. Date Report Submitted (Month, Day, Year) <b>08/08/2017</b>				14. Agency use only:																																	

Prof. Dr. Birgit Dräger  
Kanzlerin

Standard Form 425  
OMB Approval Number: 0348-0061  
Expiration Date: 10/31/2011

## Paperwork Burden Statement

According to the Paperwork Reduction Act, as amended, no persons are required to respond to a collection of information unless it displays a valid OMB Control Number. The valid OMB control number for this information collection is 0348-0061. Public reporting burden for this collection of information is estimated to average 1.5 hours per response, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding the burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to the Office of Management and Budget, Paperwork Reduction Project (0348-0060), Washington, DC 20503.

<b>Federal grant number</b>	N62909-16-1-2229
<b>Recipient organization</b>	Leipzig University, Ritterstr. 26, D-04109 Leipzig, Germany
<b>DUNS</b>	330187378
<b>EIN</b>	44-4444444
<b>Period</b>	09/30/2016-12/31/206

	<b>Amount posted [USD]</b>
<b>Section A Senior/Key Person</b>	0
<b>Section B Other Personnel</b>	0
<b>Section C Equipment Description</b>	0
 <b>Section D Travel</b>	
Foreign Travel Costs	8063.58
Total travel costs	<u>8063.58</u>
 <b>Section E Participant/Trainee Support Costs</b>	
Travel*	650.00
Subsistence*	8667.00
Total Participant/Trainee Support Costs	<u>9317.00</u>
 <b>Section F, Other Direct Costs</b>	
Materials and Supplies*	900.00
Publication Costs*	438.00
Equipment or Facility Rental/User Fees*	1200.00
Total Other Direct Costs	<u>2538.00</u>
 <b>H Indirect Costs</b>	
total indirect costs	0
 Total direct Costs	19918.58
<b>Total direct and indirect costs</b>	<b>19918.58</b>

\*costs approved by ONRG: Optical Society of America, Washington, for HISE congress 2018  
breakdown of the costs associated to the specific topic (= 1/6 of the total cost except for the HISE specific keynote speaker)



REPORT DOCUMENTATION PAGE					Form Approved OMB No. 0704-0188	
<p>The public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing the burden, to Department of Defense, Washington Headquarters Services, Directorate for Information Operations and Reports (0704-0188), 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.</p> <p>PLEASE DO NOT RETURN YOUR FORM TO THE ABOVE ADDRESS.</p>						
1. REPORT DATE (DD-MM-YYYY)		2. REPORT TYPE		3. DATES COVERED (From - To)		
05/09/2017		Final technical report		09/30/2016 to 12/31/2016		
4. TITLE AND SUBTITLE CSP - Hyperspectral Imaging and Sounding of the Environment Meeting Scholarship Fund				5a. CONTRACT NUMBER		
				N62909-16-1-2229		
				5b. GRANT NUMBER		
				N62909-16-1-2229		
				5c. PROGRAM ELEMENT NUMBER		
6. AUTHOR(S) Wendisch, Manfred				5d. PROJECT NUMBER		
				1000005830		
				5e. TASK NUMBER		
				5f. WORK UNIT NUMBER		
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Leipzig University Ritterstr. 26 D-04109 Leipzig Germany				8. PERFORMING ORGANIZATION REPORT NUMBER		
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES) Office of Naval Research Global 86 Blenheim Crescent Ruislip MX HA4 7HB United Kingdom				10. SPONSOR/MONITOR'S ACRONYM(S) n.a.		
				11. SPONSOR/MONITOR'S REPORT NUMBER(S) n.a.		
12. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release, distribution is unlimited						
13. SUPPLEMENTARY NOTES Proposal prepared in cooperation with Michael.Yetzbacher@nrl.navy.mil						
14. ABSTRACT The Hyperspectral Imaging and Sounding of the Environment (HISE) meeting was held on 14-17 November 2016 in Leipzig, Germany. The HISE meeting promoted international collaboration between innovative researchers in hyperspectral instrumentation and data analysis methods, to study geophysical and atmospheric phenomena, and to advance capabilities for anomaly- and signature-based detection. The scope of HISE continues to expand as hyperspectral measurement and detection systems proliferate. These provide unprecedented opportunities to monitor and understand our planetary system.						
15. SUBJECT TERMS Hyperspectral imaging, clouds, remote sensing						
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON	
a. REPORT	b. ABSTRACT	c. THIS PAGE			Manfred Wendisch	
UU	SAR	SAR	SAR	1	19b. TELEPHONE NUMBER (Include area code) 0049 341 97 32851	

## **Report, CSP - Hyperspectral Imaging and Sounding of the Environment Meeting Scholarship Fund**

The Hyperspectral Imaging and Sounding of the Environment (HISE) meeting was held in Leipzig, Germany, on 14-17 November 2016. This HISE meeting has promoted international collaboration between innovative researchers in hyperspectral instrumentation and data analysis methods, to study geophysical and atmospheric phenomena, and to advance capabilities for anomaly- and signature-based detection.

The scope of HISE continues to expand as hyperspectral measurement and detection systems proliferate. These provide unprecedented opportunities to monitor and understand our planetary system. Fusing hyperspectral observations with other sensing modalities shows great scientific potential and promises enhanced discrimination capabilities. Of interest is hyperspectral remote sensing over scales ranging from regional to global, and object/event-oriented to climatological.

All relevant passive, active, imaging, and sounding hyperspectral and related remote sensing programs, technologies, missions, field campaigns, signal processing, applications, validation approaches, basic research have presented their most recent research results during the conference. Additionally, research has been solicited that addresses the use of current and future measurements for providing products useful for rapid response efforts to phenomena such as downed aircraft, volcanoes, floods, changes in land cover, snow/ice cover, and treaty violations; also atmospheric events such as biomass burning, tropical storms, trace gases, and heavy aerosol events.

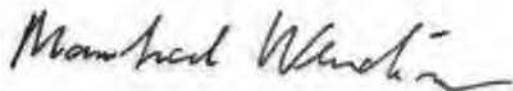
The topics for the conference included the following major areas:

- Atmospheric measurements, modeling, and compensation
- Advanced detection, image segmentation and pattern recognition
- New spectrometer design and sensor characterization
- Planned and deployed operational systems
- Multimodal fusion and visualization algorithms
- Dimension reduction and information content analysis
- Measurement of trace species in the atmosphere
- Fusion with active or passive sensors
- Thermal hyperspectral imaging
- Snapshot/Video rate hyperspectral imaging
- Inverse methods, optimal estimation, spectral fingerprinting
- Remote hyperspectral mining and agricultural products
- Material identification and quantification
- Land and sea environmental applications
- Atmospheric correction
- Weather prediction

This technical program has contributed to the US Naval Science & Technology plan by giving a forum for breakthrough scientific research and innovative technology as it relates to hyperspectral sensing of the environment. This contributes directly to the focus area of Assuring Access to the Maritime Battlespace by holding sessions on new sensor design and calibration techniques, atmospheric modeling, and advanced detection and pattern recognition, which will further technology development in improving mobile autonomous environmental sensing, matching environmental predictive capabilities to tactical planning requirements, and maximizing systems performance via adaptation to the environment. The meeting has also contributed to the focus area of Electromagnetic Maneuver Warfare through disseminating the latest information about advanced sensing techniques and understanding the electromagnetic environment through sensing. Additional sessions on material identification and quantification, thermal hyperspectral sensing and video rate hyperspectral imaging have contributed to the area of Expeditionary and Irregular Warfare by presenting the latest results related to increasing the capability for battlespace awareness and signatures management across the electromagnetic spectrum.

The attendees at this event from the Naval Research Enterprise were Dr. Michael Yetzbacher, as a Program Co-Chair and Dr. Alan Schaum, as an invited speaker. Several other naval researchers have contributed to papers presented at the conference. Notable on the program committee is Prof. Ulrich Platt, the inventor of the Differential Optical Absorption Spectroscopy technique. The keynote speaker, Dr. Stephen Tjemkes, is an internationally renowned expert in satellite remote sensing with the European Organization for the Exploitation of Meteorological Satellites.

This scholarship fund has covered the travel costs and registration of selected applicants for the HISE meeting.



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