

Report Information

Award Type	Award Number	Prime DUNS	Calendar Yr/Qtr	Final Report
Grant	0934860	066470972	2011 / 3	No

Award Recipient Information

Recipient DUNS Number	066470972	Recipient Address 1	107 SAMFORD HALL
Recipient Account Number	219045	Recipient Address 2	
Recipient Congressional District	02	Recipient City	AUBURN
Parent DUNS Number	066470972	Recipient State	AL
Recipient Type	2U.G6.M8.OH.VW	Recipient ZIP Code + 4	368490001
Recipient Legal Name	AUBURN UNIVERSITY	Recipient Country	USA
Recipient DBA Name			

Project / Award Information

Funding Agency Code	4900	Total Number of Sub Awards less than \$25,000/award	0
Awarding Agency Code	4900	Total Amount Sub Awards less than \$25,000/award	0.00
Program Source (TAS) Code	49-0101	Total Number of Sub Awards to Individuals	0
Sub Account Number for Program Source		Total Amount of Sub Awards to Individuals	0.00
CFDA Number	47.082	Total Number of Payments to Vendors less than \$25,000/award	9
Amount of Award	287553.00	Total Amount of Payments to Vendors less than \$25,000/award	1212.33
Award Date	08/20/2009		
Award Description	<p>Light microscopy is the major biological research technology that enabled modern knowledge of structure and function of biological cells. With the discovery of super-resolution light microscopy in the late 1990s the size of observable features diminished twenty times to as small as ten nanometers, promising to revolutionize sub-cellular and molecular biology research. Super-resolution microscopy is still in its infancy. Specifically, imaging speeds are below 1 frame/s. The research objective of this proposal is the development of a novel microscopy platform that combines spatial super-resolution in all three dimensions with high imaging speed of 5000 frames/s to enable study of fast intracellular events. The principle of the method is based on simultaneous illumination of the</p>		

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object by about a hundred thousand narrow light spots, each focused to the diffraction-limited size. The illumination pattern is generated by a computer-controlled digital micro-mirror device (DMD); the pattern's quality satisfies the rigid super-resolution conditions as tested by preliminary experiments. The super-resolution image will be reconstructed using 9-25 frames recorded for different illuminations. Theoretically, in linear mode the 3D resolution enhancement is two-fold compared to the classical diffraction limit. In non-linear mode of saturated fluorescence further resolution enhancement occurs with no theoretical limit. This supreme 3D imaging capability will be due to the super-resolution in axial direction and low out-of-focus light. The developed technique will be widely applicable to the study of the structural organization and dynamic processes in living cells, in particular in the area of mitochondria research.

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Project Information

Project Name or Project/ Program Title	High-speed Super-Resolution Light Microscopy for 3D Imaging of Living Cells	Activity Codes (NAICS or NTEE-NPC) (up to 10)
Quarterly Activities/ Project Description	Computational algorithms for super-resolution image reconstruction were implemented as MatLab software computer codes. Dr. Igor Makarenko from the Ioffe Institute, Russian Academy of Sciences, St. Petersburg, Russia completed his 11 weeks long J-1 visa visit to work on this project. Evaluation of sample comprised of bacteria imbedded in epoxy resin was performed. Prospects of integrated super-resolution optical and electron microscopy are under evaluation. The spatial resolution of 100 nm was achieved using standard research microscope.	Activity Code 1 B43 - NTEE Activity Code 2 Activity Code 3 Activity Code 4 Activity Code 5 Activity Code 6 Activity Code 7 Activity Code 8 Activity Code 9 Activity Code 10
Project Status	Less than 50% completed	
Total Federal Amount ARRA Funds Received/ Invoiced	44835.92	
Number of Jobs	0.80	
Description of Jobs Created	Faculty, Scientist	
Total Federal Amount of ARRA Expenditure	73360.29	
Total Federal ARRA Infrastructure Expenditure	0.00	
Infrastructure Purpose and Rationale		

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Infrastructure Contact

Name	Street Address 1
Email	Street Address 2
Phone	Street Address 3
Ext	City
	State
	ZIP Code + 4

Primary Place of Performance

Address 1 Department of Anatomy,
Physiology and Pharmacology
Address 2 109 Greene Hall
City Auburn University
Country Code US
State AL
ZIP Code + 4 36849 - 0001
Congressional District 02

Recipient Highly Compensated Officers

Prime Recipient Indication of Reporting Applicability	No	Officer 3 Name
Officer 1 Name		Officer 3 Compensation
Officer 1 Compensation		Officer 4 Name
Officer 2 Name		Officer 4 Compensation
Officer 2 Compensation		Officer 5 Name
		Officer 5 Compensation

Report Audit Trail

Created By Cindy Selman
Date Created 10/02/2011 10:29 PM
Last Updated By Cindy Selman
Last Updated On 10/11/2011 03:40 PM

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Sub Recipient Information

Sub Recipient DUNS Number	800771149	Sub Recipient Address 1	301 UNIVERSITY BLVD
Sub Recipient Congressional District	14	Sub Recipient Address 2	
Sub Recipient Type	2F.M8.OH.VW	Sub Recipient City	GALVESTON
Sub Recipient Legal Name	UNIVERSITY OF TEXAS MEDICAL BRANCH AT GALVESTON	Sub Recipient State	TX
Sub Recipient DBA Name	UNIVERSITY OF TEXAS MEDICAL BR	Sub Recipient ZIP Code + 4	77555302
		Sub Recipient Country	USA

Sub Award Information

Sub Award Number 11-CVM-219045-UTMB
Amount of Sub Award 253620.00
Total Sub Award Funds Disbursed 52340.45
Sub Award Date 06/09/2011

Sub Recipient Place of Performance

Address 1 301 University Blvd
Address 2
City Galveston
Country Code US
State TX
ZIP Code + 4 77555 - 0156
Congressional District 14

Sub Recipient Highly Compensated Officers

Prime Recipient Indication of Reporting Applicability	No	Officer 3 Name	
Officer 1 Name		Officer 3 Compensation	
Officer 1 Compensation		Officer 4 Name	
Officer 2 Name		Officer 4 Compensation	
Officer 2 Compensation		Officer 5 Name	
		Officer 5 Compensation	

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