

PIONEERS IN COLLABORATIVE RESEARCH®



NRI Technical Program Group Meeting

Mar. 02, 2017





- NRI personnel change
- NRI IP update
- E2CDA (NRI) on-site reviews
- NRI-NIST and E2CDA (NRI) semi-annual reports
 - Need volunteers to review reports
- Open mic





 Mary Altman will support NRI and nCORE in the future (mary.altman@src.org)





	IP	IP Filing	Center	Title	University	Inventors	Туре	Status
Detent leaved	1012040	D1440		Creations Device Including Angular Solit Coto	University of Minsipie	Aville Chash and Dadway Califor		Congratulations!!!
Patent Issued	IP1384N	P1448	INDEX	Graphene Device Including Angular Split Gate	University of Virginia	Avik Grosn and Redwart Sajjad	Othity	Patent# 9,570,559 Issued 2/14/2017
						Avik Ghosh, Mirza Elahi and		PENDING: UVA is determining whether
NEW	IP1626N		INDEX	PRism Geometries in Graphene	University of Virginia	Yaohua Tan		Prior Art exists
Needs to be								
reviewed for								
Conversion to								
Utility App at								
May 2017			NRI / STARnet	A Contencatable Magnetoelectric Magnetic		Azad Naeemi, Sourav Dutta		
TPG; Due Needs to be	IP1560N	P1613	Benchmarking	Tunneling Junction Computational Device.	GAlech	and Chenyun Pan	Provsional	Provisional Application filed 7/19/2016
reviewed for								
Conversion to								
Utility App at								
August 2017						Krill Belashchenko, Oleg		
TPG; Due				Magnetoelectric Memory Cell with Domain-Wall-		Tchemyshyov and Alexander		
11/8/2017	IP1593N	P1650	CNFD	Mediated Switching	University of Nebraska/Lincoln	Kovalev	Provsional	Provisional Application filed 11/8/2016
Needs to be								
reviewed for								
Conversion to								
Oct 2017 TRG				UNMATI (Upipolar Magneteoloctric Magnetic		Nichtha Sharma and Androw		
Due	IP1586N	P1668	CNED	Tunnel lunction)	UT Dallas	Marshall	Provsional	Provisional Application filed 1/23/2017
reviewed for		. 1000						
Conversion to								
Utility App at								
November								
2017 TPG;						Peter Dowben, Christian		
Due				Anti-Ferromagnetic Magneto-electric Spin-Orbit		Binek, Xia Hong, Jonathan Bird		
2/17/2018	IP1603N	P1676	CNFD	Read Logic	University of Nebraska/Lincoln	and Kang Wang	Provsional	Provisional Application filed 2/17/2017

- Will review provisional IPs to decide whether to file full application
- IP budget needs to be considered beyond 2017





July 25 (UIUC) **Electronic-Photonic Integration Using the** May 11 (Penn State) Enerav Efficient **Transistor Laser for Energy-Efficient Computing** Link to MRI 2DLM workshop Computing with U. Illinois/Urbana-Champaign, U. Chicago Chip-Based **2D Electrostrictive FETs GRC** only for Ultra-Low Power **Circuits and** MIT **Architectures** Stanford July 20 (MIT) Penn State UC-San Diego After INDEX review Memory, Logic, and Logic in **Memory Using** Energy Three Terminal Efficient **Magnetic Tunnel** Learning Junctions **Machines** MIT (ENIGMA) Aug. 14 UC-Berkeley (UC Berkeley) A Fast 70mV Transistor Stanford Technology for Ultra-Low-EnergGRC only Center for \checkmark **Excitonic Devices** U. Virginia UC-San Diego Purdue MIT Self-Adaptive Reservoir UC-Santa Barbara **EXtremely Energy Computing with Spiking** Princeton Neur GRC only Algorithms of the second secon **Efficient Collective ELectronics (EXCEL)** Feb. 16 (UCSB) Architectures Notre Dame After FAME review Penn State, U. Chicago

May 31 - Jun 1 (Notre Dame)

Georgia Tech, UC-San Diego





"Excitonic Devices" at UCSD, Feb. 16, 2017

Agenda

Time	Title	Speaker	photonio source	2	photonic drain	
8:45 - 9:00 am	Set up room, get posters set up, site visit te	am arrives		_		
9:00 - 9:15 am	Project Overview	Leonid Butov (UCSD)	input v7	Gate	output	
9:15 - 10:00 am	Theme Experimental studies of excitonic devices	Leonid Butov (UCSD)	gate		gate	
10:00 - 10:45 am	Theme Theoretical studies of excitonic device	es Michael Fogler (UCSD)		Ws	i	
10:45 - 12:45 pm	Lunch Break (Faculty club) Posters (4322 Mayer Hall)				♥ ♥ n	
12:45 - 1:30 pm	Theme Design and growth of heterostructur	es Loren Pfeiffer (Princeton, remotely)		\bigwedge	energy bump — controlled by the Gate	
1:30 - 2:15 pm	Theme Interaction of light and matter in excitonic devices	Vladimir Bulović (MIT)	ton end	\overleftrightarrow	exciton flow is off	
2:15 - 2:45 pm	Theme Epitaxial growth of semiconductor structures	Daehwan Jung (UCSB)	Exci	>	$\xrightarrow{\text{exciton flow is on}} x$	
2:45 - 3:00 pm	Coffee Break					
3:00 - 4:00 pm	Facility Tour	Droof of concents in		-+ 110L	/	
4:00 - 5:00 pm	NRI Internal Discussion	oor or concept: In III-v Qvvs at IIUK				

5:00 - 6:00 pmDebrief with NRI/Faculty6:30 pmDinner

NRI participants: Dmitri Nikonov (Intel), Steve Kramer (Micron), Arup Polley (TI), An Chen (NRI/IBM) Proof of concept: in III-V QWs at 110K RT operation: high binding energy in TMD Long lifetime: indirect exciton

Status: RT exciton in TMD with 10s of ns lifetime Next step: control exciton transport and gating





Deadline: Mar. 31 to submit NRI-NIST center reports to NIST Review timeline: Please return feedback by Mar. 15; center revision Mar. 15-30

Centers/Projects	Volunteer reviewers			
INDEX center	Wilfried Haensch			
SWAN center	Ravi Pillarisetty			
CNFD center	Steve Kramer			
Benchmarking	Dmitri Nikonov			
EXtremely Energy Efficient Collective ELectronics (EXCEL)	Steve Kramer, Seyoung Kim, Wilfried Haensch			
Excitonic Devices	Dmitri Nikonov			
Electronic-Photonic Integration Using the Transistor Laser for Energy-Efficient Computing				
Memory, Logic, and Logic in Memory Using Three Terminal Magnetic Tunnel Junctions	Ching-Tzu Chen			
2D Electrostrictive FETs for Ultra-Low Power Circuits and Architectures				
Energy Efficient Learning Machines (ENIGMA)	Geoff Burr			



- NRI/STARnet Benchmarking mid-Year Review (Apr. 6 and 13, via WebEx)
- INDEX review: Jul. 18-19, Columbia U.
- CNFD review: Aug. 29-30, U. Nebraska at Lincoln
- SWAN review: Sep. 13-14, Austin, TX
- NRI Annual Review: Gaithersburg, MD
 - NRI Final Annual Review: Oct. 17
 - NRI/STARnet Benchmarking Workshop: Oct. 18
 - E2CDA Annual Review: Oct. 19-20





Open Microphone