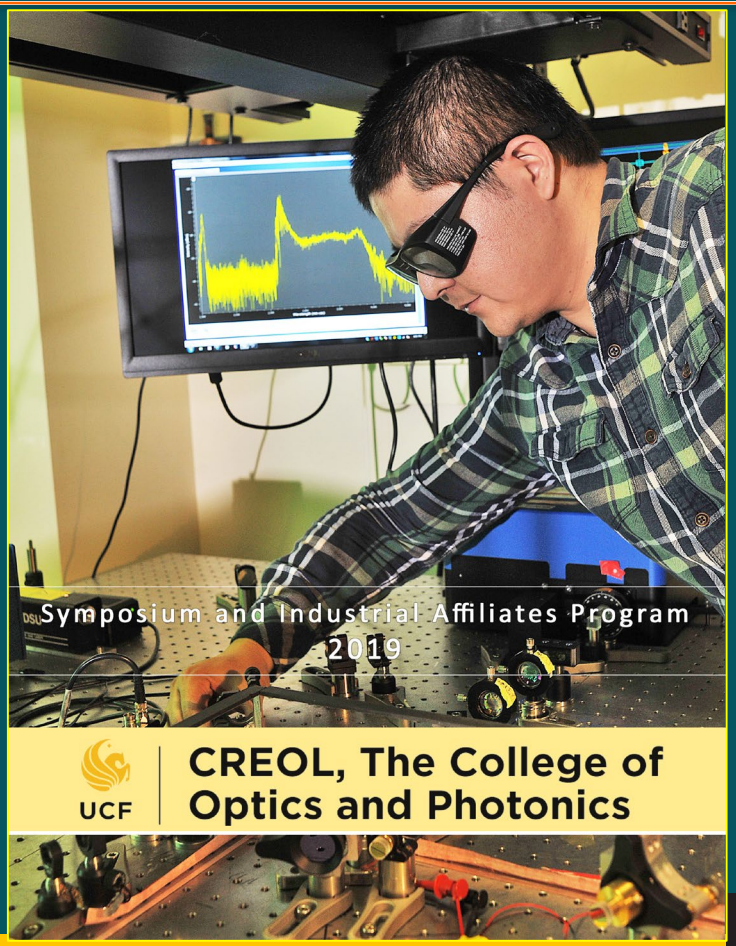
28th

Industrial Affiliates Symposium

Advances in Optics & Photonics

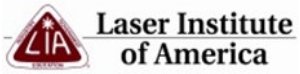


Welcome & Thanks!

Sponsors

Exhibitors


IEEE
photonics
SOCIETY
Transforming science into technology™


LIA
Laser Institute
of America


OSA
The Optical Society


SID
SOCIETY FOR INFORMATION DISPLAY


SPIE.


AFL


Amplitude


Analog Modules, Inc.
a NEICO company
Specialist in Analog and Laser Electronics


ASML


OXFORD
INSTRUMENTS
ANDOR


BAE SYSTEMS


COHERENT
NUFERN


Elbit Systems
of America


gentec-eo
PARTNERS for ACCURACY


imec


Newport
Experience | Solutions


NKT Photonics

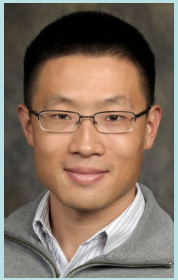

OptiGRATE
An IPG Photonics Company


OPHIR
Photonics
Spiricon
OPHIR Photonics
Photon
OPHIR Photonics


Tektronix®


THORLABS

Short-Course Presenters



Shou “Sean” Pang
CREOL

Computational Optical Imaging

Peter Delfyett
CREOL

Fundamentals of Ultrafast Photonics

Shin-Tson Wu
CREOL

Emerging Augmented Reality & Virtual Reality Displays

Aristide Dogariu
CREOL

Mechanical Action of Light & Applications

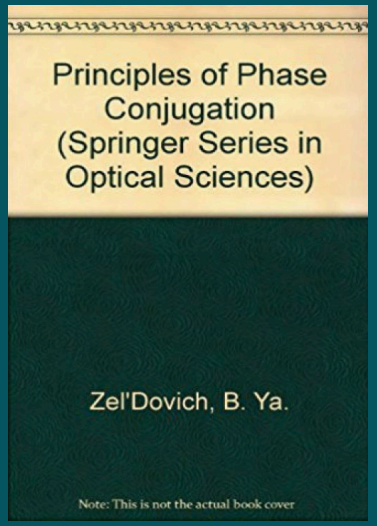
Nelson Tabiryan
BEAM Co.

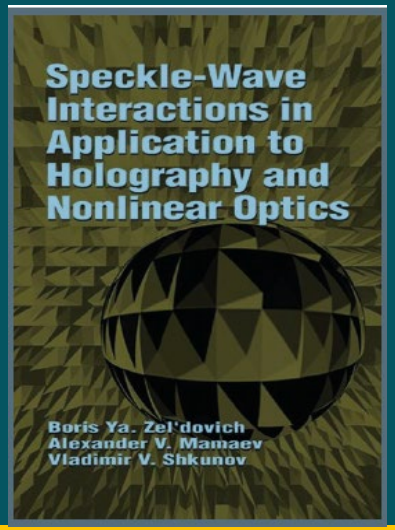
Tribute to
Boris Zel'dovich

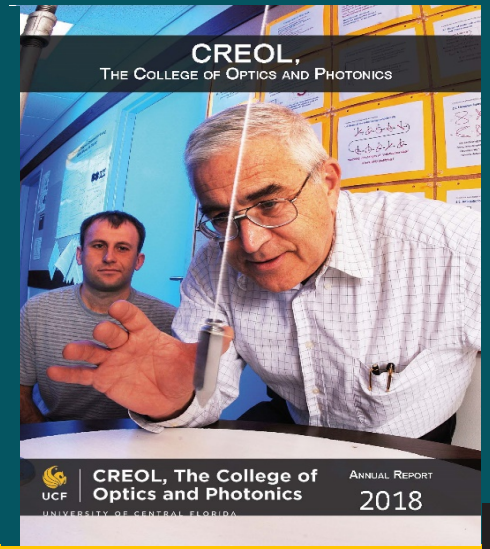
Boris Zel'dovich

Professor Emeritus Boris Zel'dovich joined the CREOL faculty in 1994 and retired last year.
Before coming to UCF, he had a distinguished career in the USSR, and was a member of the USSR Academy of Sciences and a recipient of the USSR State Prize.

He is well known for his discovery of optical phase conjugation and he is the recipient of the OSA Max Born Award







Student Speakers

Rafael Guzman

Optical Monitoring of Blood Coagulability during Cardiovascular Surgery via Coherence-Gated DLS

Student of the Year

Sepehr Benis

Large Optical Nonlinearities in Transparent Conductive Oxides at Epsilon-Near-Zero

Nafiseh Mohammadian

Performance Comparison of Millimeter Wave Imager Configurations

Jonathon White

Attosecond Streaking Phase Retrieval with Deep Neural Network

Best Poster Award

Congratulations

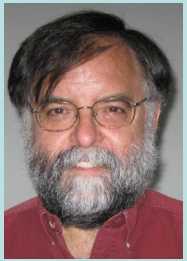
Students name

Sajad Saghaye Polkoo

Imaging Beam Steering for LiFi Communication

Invited Speakers

2019 Distinguished Alumni Award



Stan Whitcomb
CalTech

Craig A. Hoffman
NRL

Ursula Gibson
NUST

Clara Rivero Baleine
Lockheed Martin

Demetrios
Christodoulides
UCF

David Hagan
UCF

Miguel Bandres
UCF

Stephen Kuebler
UCF

SPIE Guest Speaker

Kent Rochford
SPIE CEO

Affiliates Presenters

Alexei Glebov
OptiGrate

Optigrate—from CREOL research to world markets

Eric Park
Q-Peak

Laser innovation since 1985

Jeffrey Oleske
Andor Technology

Focus on results

New Industrial Affiliates: *Welcome*

Industrial Affiliates Members

Life Member

Cobb Family Foundation
Northrop Grumman Corporation
Nufern

Memorial Member

Dr. Arthur H. Guenther and Dr. William C. Schwartz

Medallion Member

Alio Industries
Breault Research
Coherent, Inc.
IPG Photonics
Newport
Northrop Grumman Laser Systems
Synopsys
Paul G. Suchoski, Jr

Senior Member

AFL
Amplitude Laser, Inc
ASML US
BAE Systems
CST of America
FARO Technologies
LAS- CAD GmbH
Lockheed Martin
Oculus Research
Optimax Systems
Tektronix
Zemax
Zygo Corporation

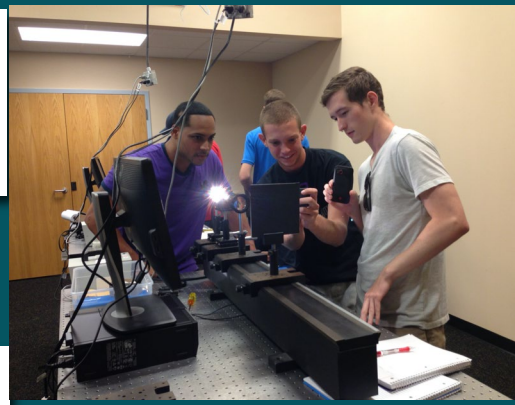
Affiliate Member

Aerotech Inc.
Analog Modules
Andor Technology
Applicote
Asphericon
Beam Co.
DataRay
Edmund Optics
Elbit Systems of America
eVision, LLC
Finetech
Gentec-EO
Harris Corporation
HORIBA Jobin Yvon
JENOPTIK Optical Systems
LIA
LGS Innovations
Lightpath
Luminar
Menlo Systems
NKT Photonics
Ophir-Spiricon
Optigrate
Optronic Laboratories
OIDA
OSA
Plasma-Therm
Plasmonics
Princeton Instruments
Q-Peak, Inc
Raytheon
SPIE
Thorlabs
Tower Optical Corporation
TwinStar
ULVAC Technologies, Inc
Yokogawa

Industrial Affiliates Program

Benefits to CREOL

- Student access to internships and access to employment opportunities
- Industrial advisory role in educational matters
- Financial and in-kind support enhances our instructional & research lab



Benefits to Affiliates

- Ready and early access to R&D results & state-of-the-art research facilities
- Early access to graduating students

Benefits to Both

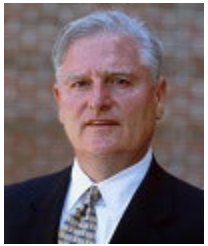
- Networking for federally funded industrial programs (SBIR's, STTR's, ..)

Florida Photonics Cluster

Alexei Glebov
President

James Pearson
Executive Director

THE CORRIDOR
FLORIDA HIGH TECH



Ed Schons
President

CREOL Staff

Overview of CREOL

32 years
Research and Education in Optics & Lasers

CREOL History

2020

2020 New Dean 

2013 BS degree in Photonic Science and Engineering

2013 Institute for the Frontier of Attosecond Science & Technology 
Zenghu Chang

2010

2009 New Dean 
Bahaa Saleh


Martin Richardson


Peter Delfyett

2006 Townes Laser Institute

2005 Florida Photonics Center of Excellence

2004 Became a graduate college, first in US.


Eric Van Stryland

2000

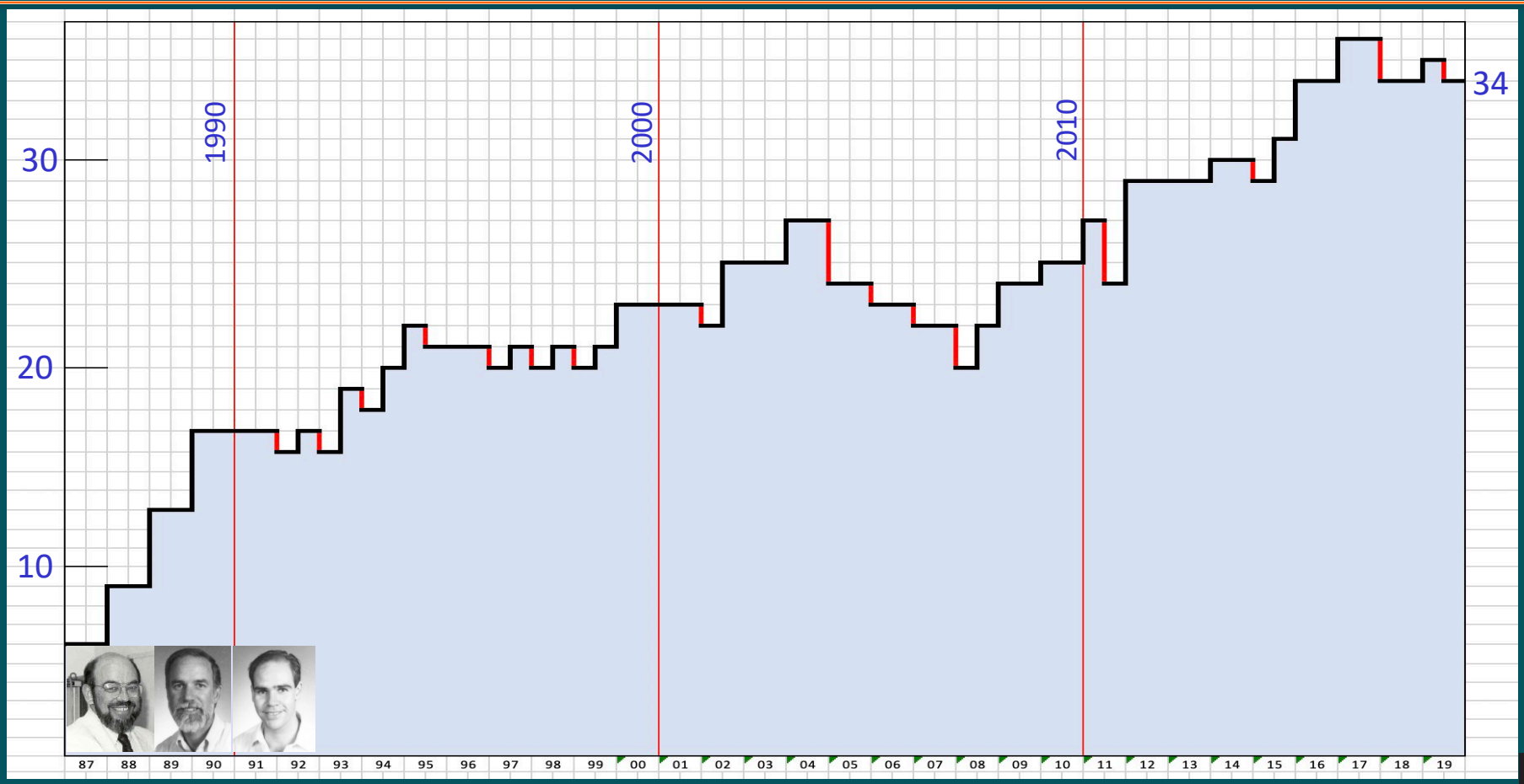
1999 Became the School of Optics

.
.
.

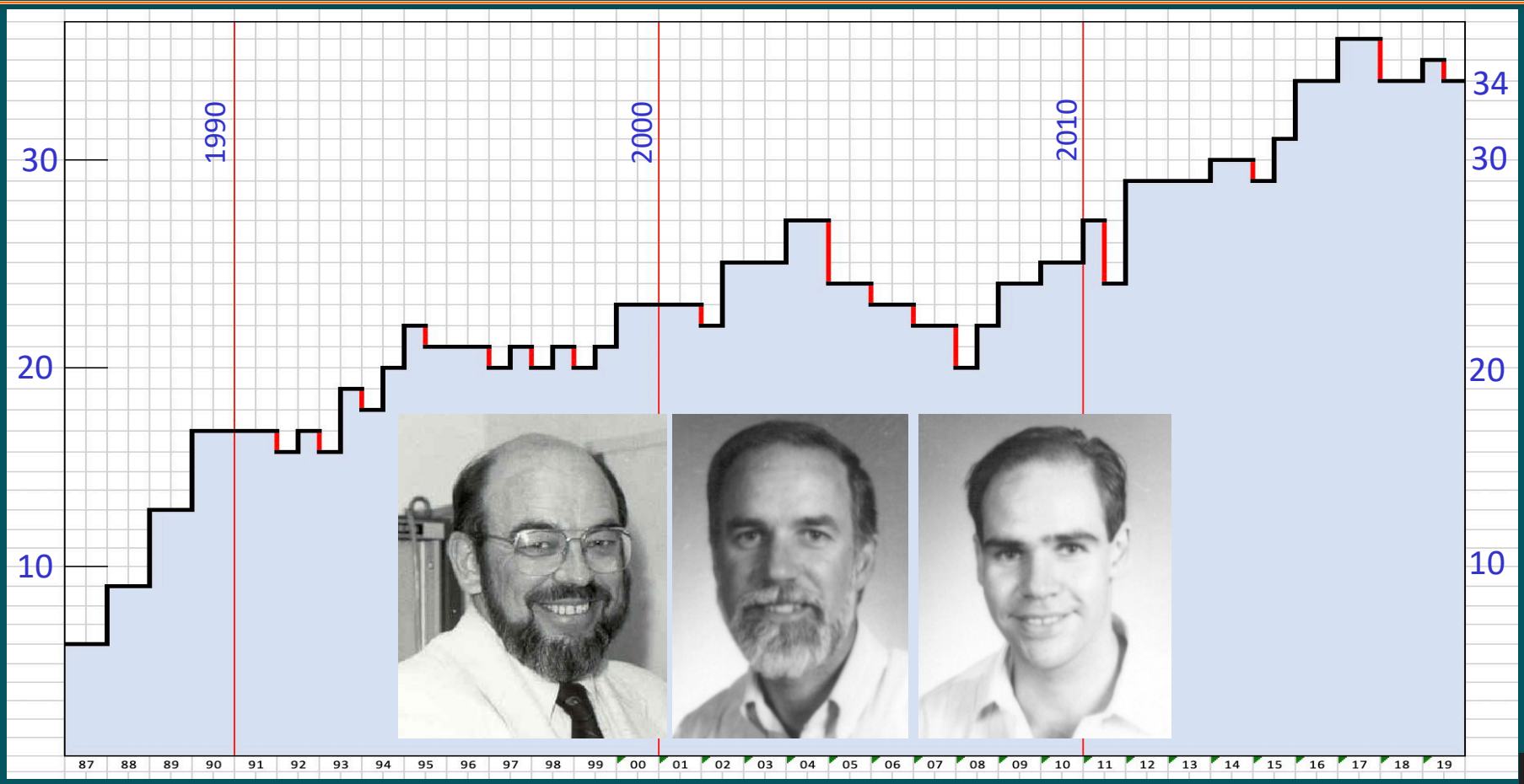
1987

1987 Founded as Center for Research & Education in Optics & Lasers. 
MJ Soileau

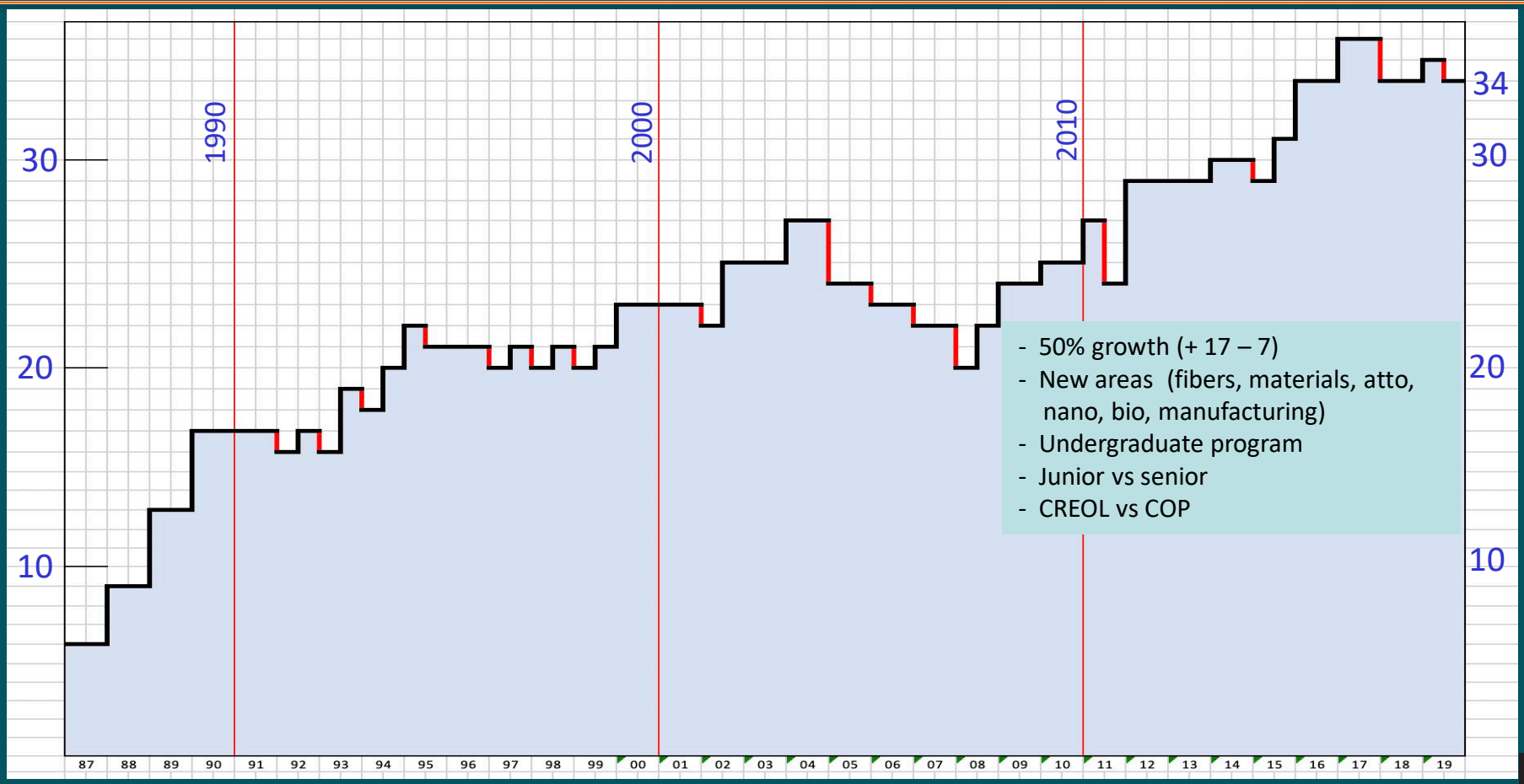
❑ History of faculty growth



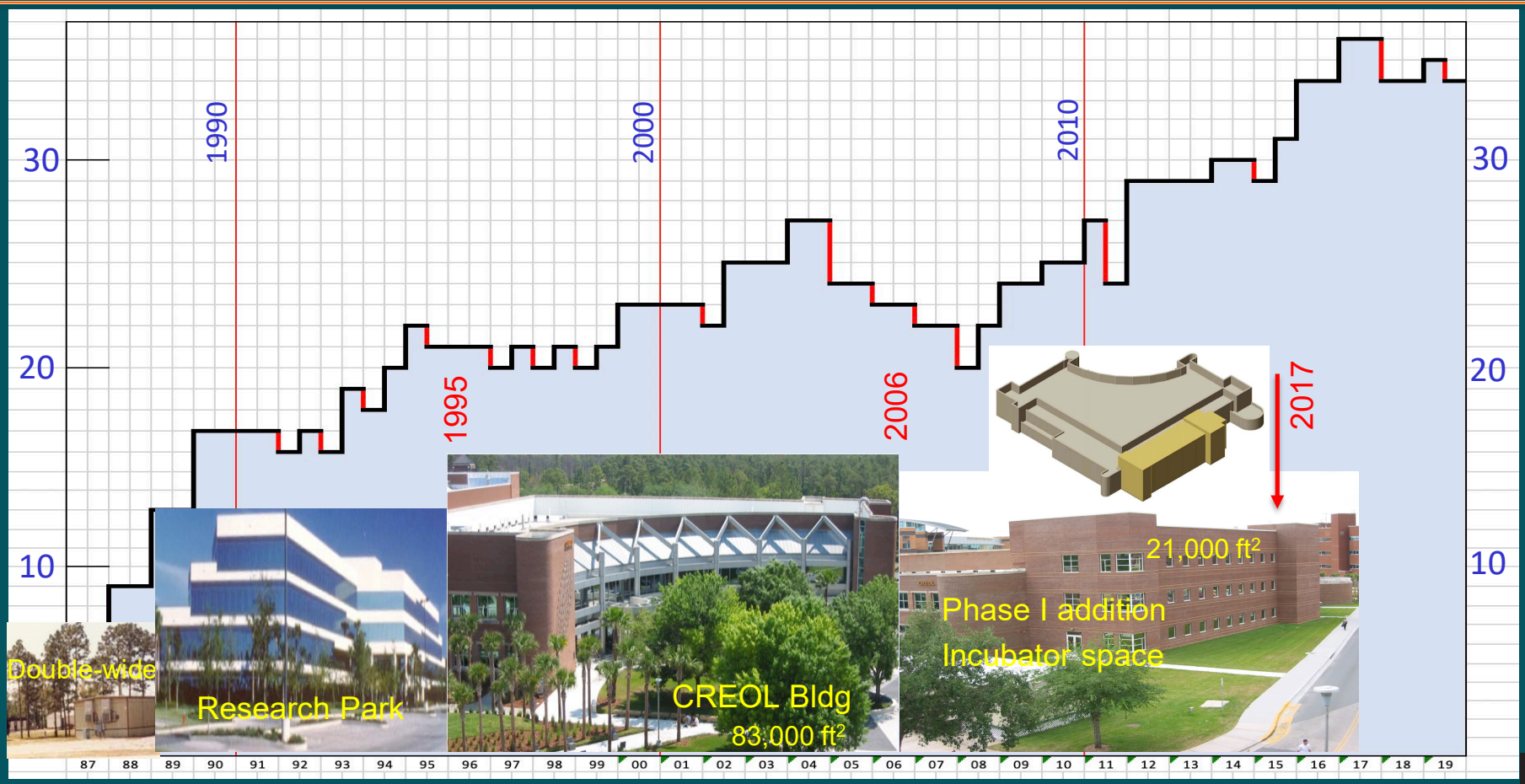
❑ History of faculty growth



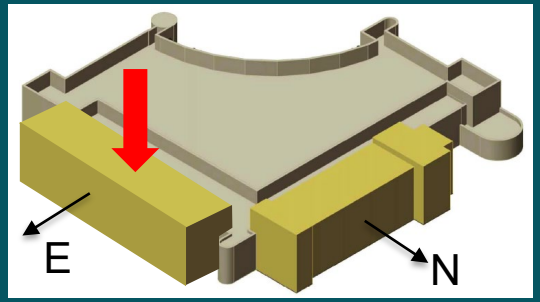
❑ History of faculty growth



❑ History of faculty growth



Phase II Addition



Unfinished space for new auditorium

Naming Opportunity

Optical Materials Lab (OML)

State-of-the-art lab fabrication & characterization capabilities for research in optical ceramics, IR glasses and glass-ceramics & optical fibers.

Powder processing and sintering equipment, MOCVD fiber-preform fab lab.

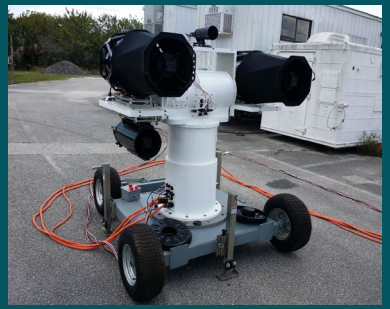
Cesar Blanco in the Optical Materials Lab located separate from CREOL.

Townes Institute Science & Technology Experimentation Facility (TISTEF)

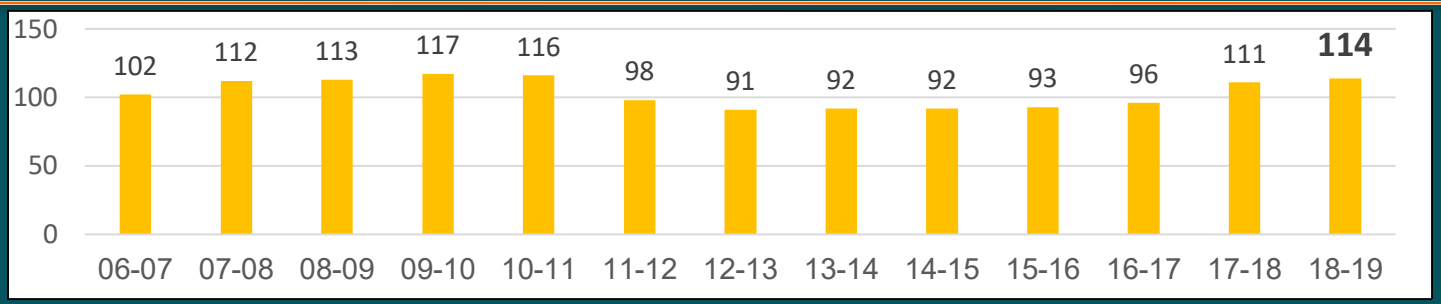
Government asset specializing in in-situ Optical Target Characterization using remote sensing.

Operated and maintained by UCF

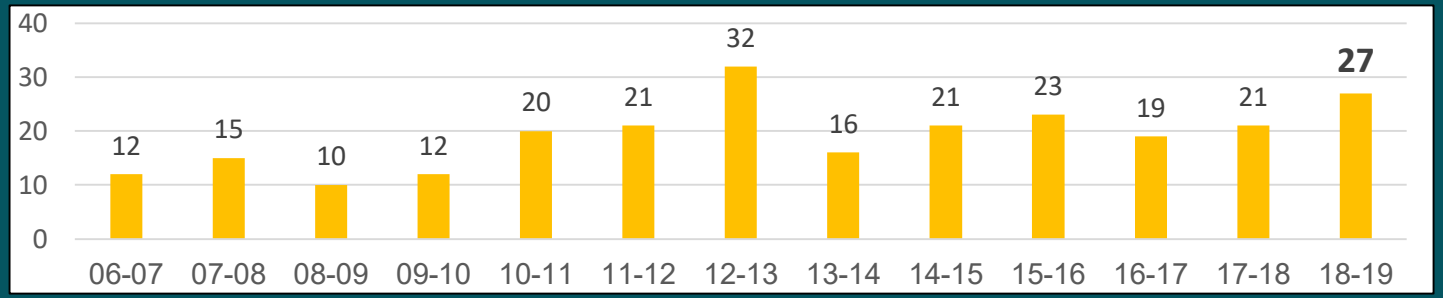
Based at Kennedy Space Center on Merritt Island, 40 miles East of Orlando



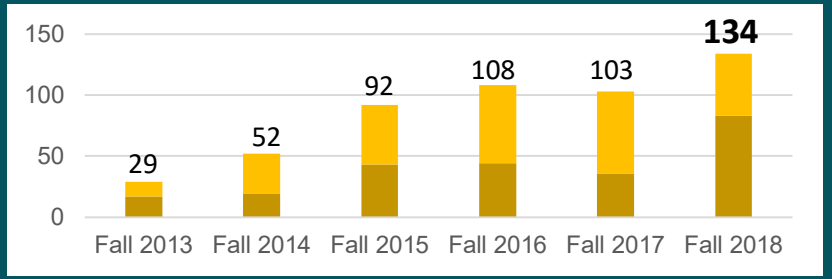
PhD


150
100
50
0
102
112
113
117
116
98
91
92
92
93
96
111
114
06-07
07-08
08-09
09-10
10-11
11-12
12-13
13-14
14-15
15-16
16-17
17-18
18-19

MS

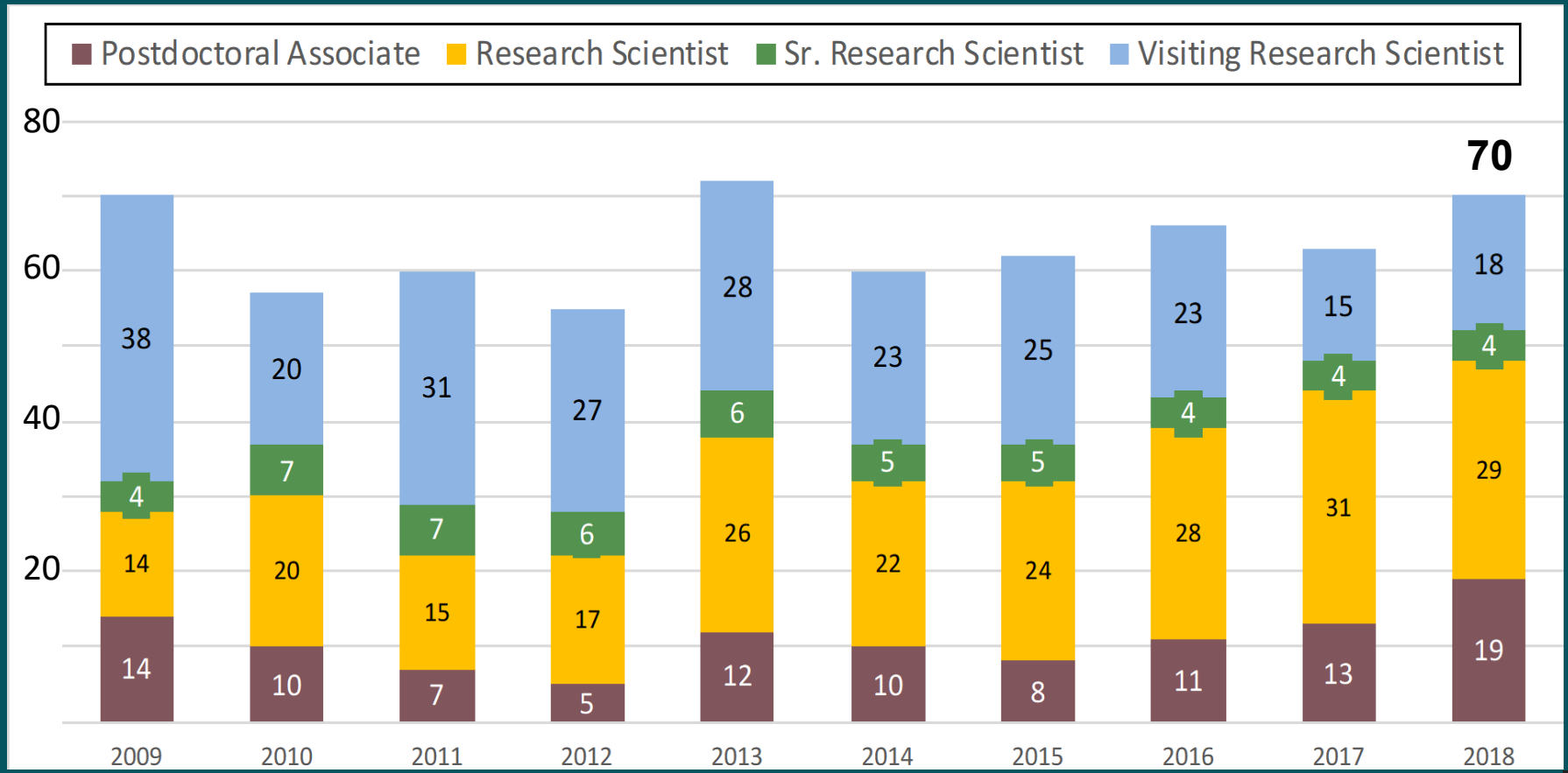

40
30
20
10
0
12
15
10
12
20
21
32
16
21
23
19
21
27
06-07
07-08
08-09
09-10
10-11
11-12
12-13
13-14
14-15
15-16
16-17
17-18
18-19

BS

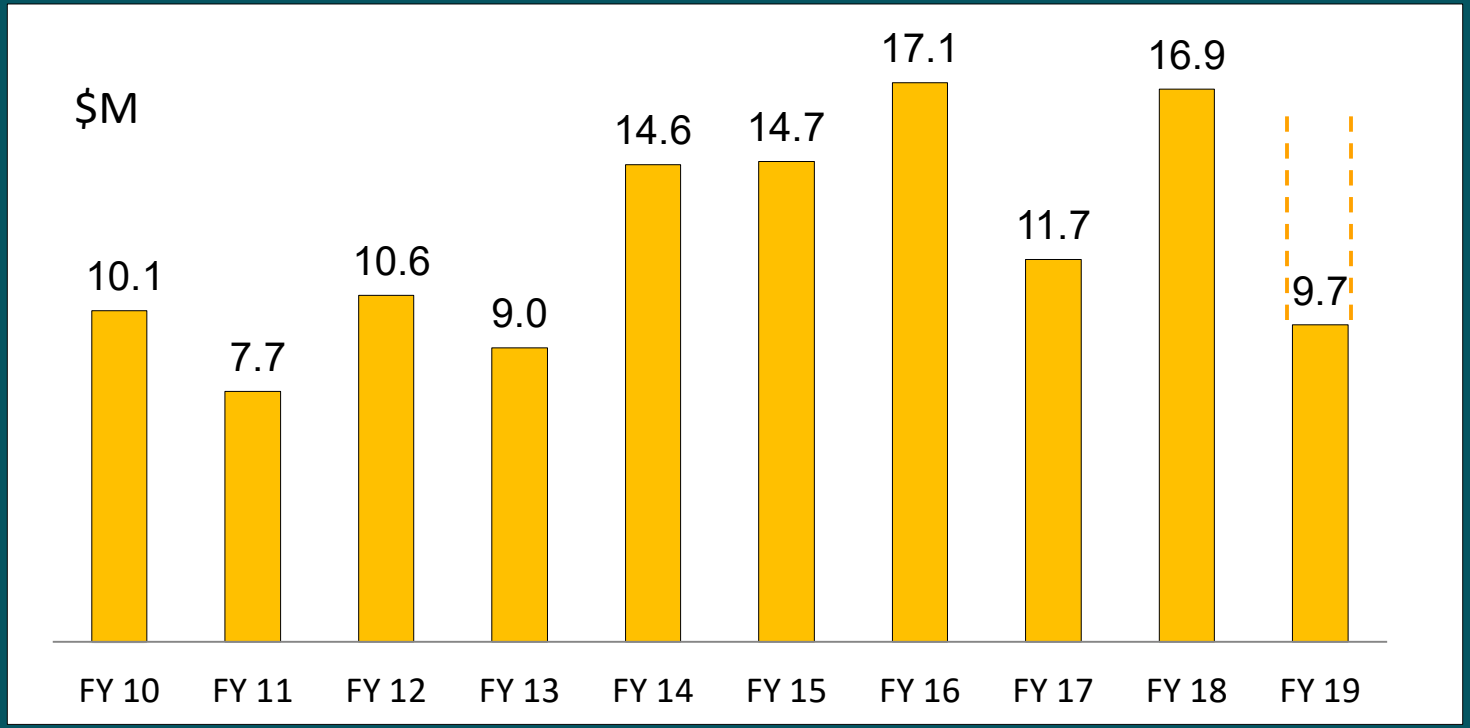

150
100
50
0
29
52
92
108
103
134
Fall 2013
Fall 2014
Fall 2015
Fall 2016
Fall 2017
Fall 2018

Industry (26)	
Amazon	IPG
Apple x4	KLA-Tencor
ASML x3	Lumentum x2
Aquitaine	Luminar
Facebook	MACOM
Google	Micron
Harris x2	Microsoft x3
Infinera x2	Nufern

Academia & Research Labs (21)	
Caltech, Chalmers U	AFRL,
Joint Quantum	Air Force
Institute U Maryland x2	ARL
Northwestern	Right Patterson
Princeton	NIST
Stanford (SLAC)	
U Rochester (Lab Laser Energetics)	Academy of Sci Beijing
UCF	Ctr Relativistic Laser Sci (S. Korea)
	ICFO (Spain)
	Nanjing Univ (China)

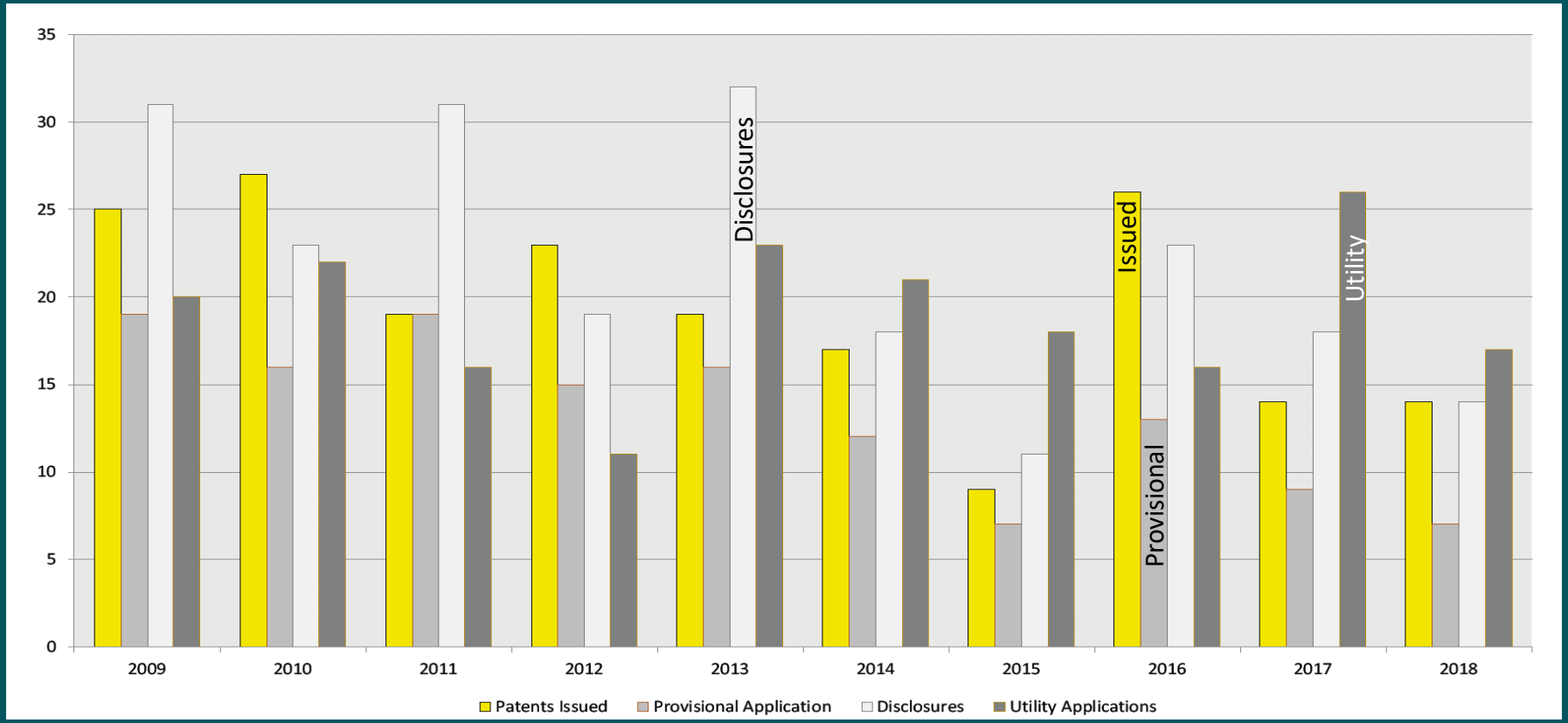

Postdoctoral Associate
Research Scientist
Sr. Research Scientist
Visiting Research Scientist
80
60
40
20
70
38
4
14
14
20
7
20
10
31
7
15
7
27
6
17
5
28
6
26
12
23
5
22
10
25
5
24
8
23
4
28
11
15
4
31
13
18
4
29
19
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018

History of Research Funding



Funding from/through industry $2.6M

❑ Patents


35
30
25
20
15
10
5
0
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
Disclosures
Issued
Provisional
Utility
Patents Issued
Provisional Application
Disclosures
Utility Applications

Spinoffs currently existing in one form or another

- Crystal Photonics
- Beam
- OPTIGRATE
  - Acquired by IPG
- Midsoft
- Medical Lighting Solutions
- LP Photonics
- Raydiance
  - Acquired by coherent
- sdPhotonics
- Plasmonics
- IRRadiance
  - Acquired by Rochester Precision Optics
- Lambda Photonics
- Olkin Optics

32 years Research and Education in Optics & Lasers

318 PhD degrees	425 MS degrees	41 BS degrees
34 Books	> 4,200 journal papers	> 100,000 citations
> $277M external funding		
317 patents	29 spinoffs	213 industrial partners

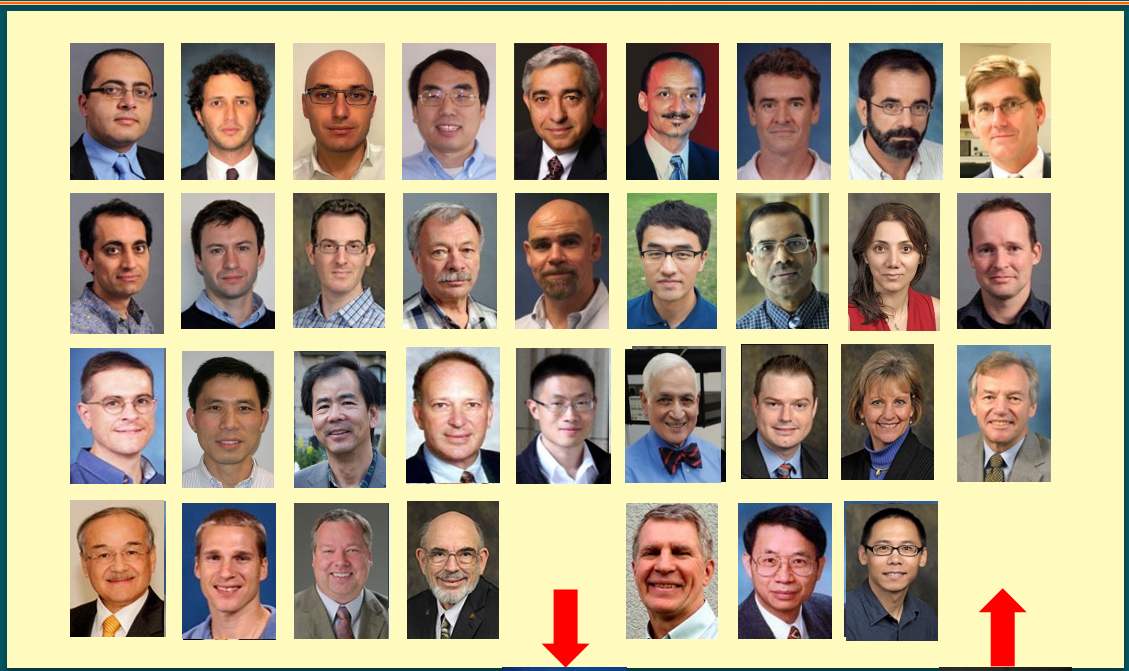
	Fellows	Awards
OSA The Optical Society	25	Max Born[3], Holynyak, Wood[3], Fraunhofer, Beller[3], Mees
SPIE	16	Gold Medal, Kingslake, Gabor, Stokes[2], BACUS, Edgerton
IEEE photonics SOCIETY	12	Engineering Achievement
APS physics	8	Bouchet
LIA Laser Institute of America	2	
SID	1	Rajchmann, Slottow-Owaki
The American Ceramic Society	2	Outstanding Educator
National Society of Black Physicists	1	

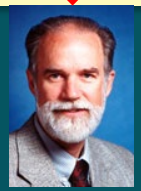
	Fellows
NAI National Academy of Inventors	7
AAAS	2
Jefferson Science Fellowship Fellowships Office	1
John Simon Guggenheim Memorial Foundation	1
Florida Inventors Hall of Fame	2

NSF CAREER	7
ONR YIA	4

Highlights
since 2018 Industrial Affiliates Conference

Faculty

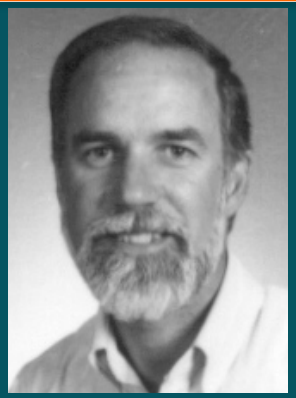




Eric Van Stryland
"retires"

Miguel Bandres
joined the faculty

Retirements

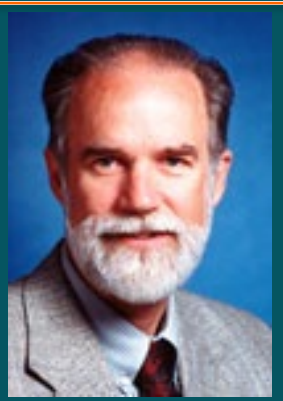


Eric Van Stryland
CREOL co-founder

. . .

Director, CREOL, 1999-04
Founding Dean, 2004-09
President, OSA, 2006
Fellow, OSA, SPIE, IEEE, APS
OSA Wood Prize, 2012
ISI Highly Cited Author
. . .

. . .



Professor & Dean Emeritus

Large bequest made by Eric & Barbara Van Stryland

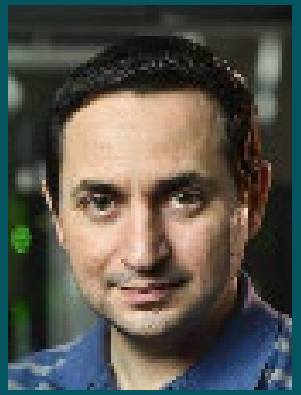
CREOL Founding Faculty Graduate Fellowship Fund

New Faculty

Miguel Bandres

Ph.D., CalTech
Postdoctoral fellow, Technion

Research area: Novel optical beams & topological photonics.



Promotions

Promotion to Professor

Sasan Fathpour

Promotion to Associate Professor with Tenure

Romain Gaume

Mercedeh Khajavikhan

Demetrios Christodoulides

OSA Max Born Award

2018 Faculty Awards & Honors

Axel Schulzgen
Fellow, OSA

2018 Faculty Awards & Honors

Mercedeh Khajavikhan
DARPA Young Faculty Award

Topological Phenomena in
Active Photonic Platforms

2018 Faculty Awards & Honors

Peter Delfyett
Townsend Harris Medal
The City College of NY

ST Wu
Honorary Professorship
National Chiao Tung University, Taiwan

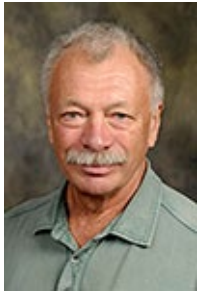
2018 Faculty Awards & Honors

Kathleen Richardson
Pegasus Professor Award

Aristide Dogariu
Trustee Chair

FPCE Professorships

Ayman Abouraddy



Leon Glebov

Kathleen Richardson

2018 Faculty Awards & Honors

Rodrigo Amezcua Correa

Reach for the Stars Award

Debashis Chanda

Reach for the Stars Award

Mercedeh Khajavikhan

Luminary Awards

2018 Journal Publications

Science	2
Nature	1
Nature Photonics	3
Nature Physics & Nature Electron.	2
Nature Communication	4
PNAS	1
Scientific Reports	8
Light & Science Applications	5
Nanophotonics	1
Adv Optical Materials	1

27

PHYSICS 24

PRL	4	J Phys B	3
Phys Rev	4	J App Phys	1
APL	3	App Sci	2
Phys St Sol	3	Laser Phys	1
Others	3		

CHEMISTRY 21

ACS Pho	5	Biochem	3
J Phys Chem	4	ACS Energy	1
Phys Chem	2	ACS Macro	1
Spectr Acta	2	ACS Nano	1
Nano Lett	1	Nanoscale	1

IEEE 22

JSTQE	8	JQE	2
JLT	5	PTL	2
Pho J	4	Trans ED	1

MATERIAL 19

Opt Mat Express	4	J SID	2
Adv Opt Mat	1	Sol Energy Mat	3
Adv Ener Mat	1	J Manufac Sc	1
Liquid Crystal	2	SuperLat & Microst	2
MRS Adv	1	J Mat Chem	2

OPTICS 74

Optica	7	App Opt	1
Opt Letters	15	Opt Eng	8
Opt Express	28	Opt Comm	2
JOSA A,B	6	Opt & Lase in Eng	1
Pho Research	5	OPN	1

BIO 2

J Biophotonics	1
Biosensors Basel	1

189 papers

2018 Conference Presentations

CLEO	34
SPIE Photonics West	24
SPIE conferences & meetings	39
FIO	5
OSA Topicals	11
OFC	9
IEEE Summer Topicals + Conferences	9
DEPS-Directed Energy	8
ECOC	5
ICALEO	3
MRS meetings	5
Glass & Opt Materials	3
Others	43

198

IGNITE
THE CAMPAIGN FOR UCF

CREOL's 2019 goal is $5M

~$8M since beginning of campaign
~$4.7M Gift in kind
~$2.7M CREOL Founding Faculty Graduate Fellowship Fund

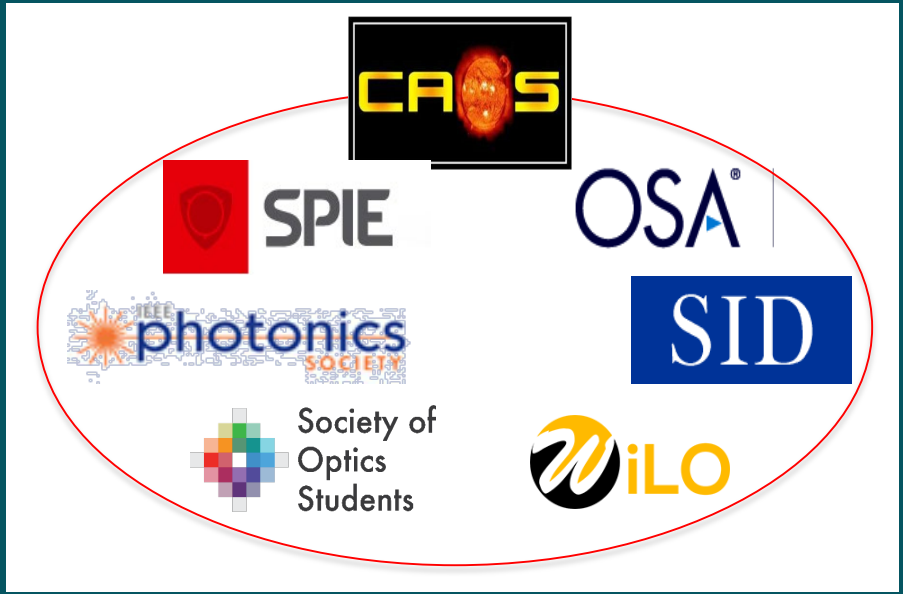
George Stegeman Memorial Graduate Scholarship $72K

Believe Campaign 2019

believe
UCF FACULTY & STAFF CAMPAIGN

CREOL General
CREOL Graduate and Post-Doctoral Fund
Frances Townes Endowed Fellowship
George Stegeman Memorial Endowed Scholarship
CREOL/Industrial Affiliates Program
Other

Student Organizations



IONS 2019

CREOL

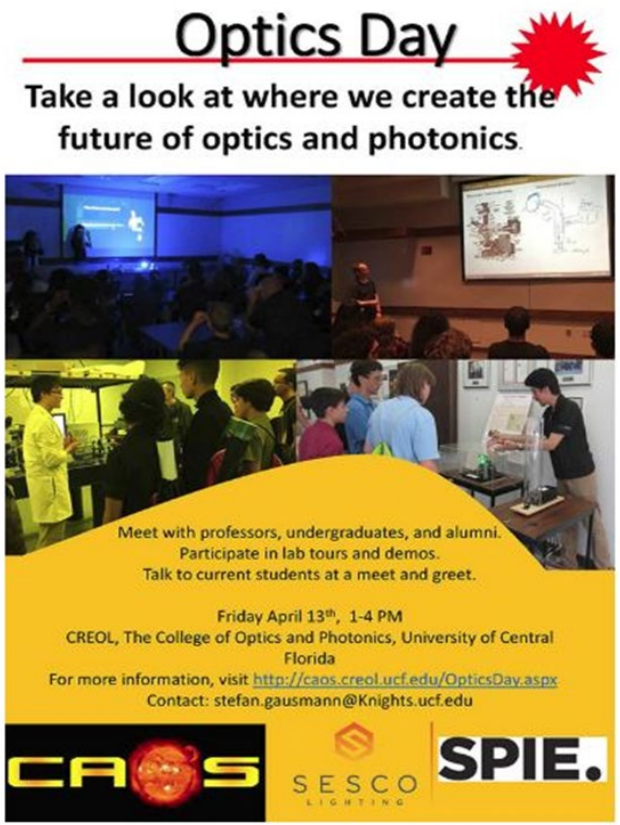
UCF

STEM Day. March 29, 2019

UCF STEM EXPLORING SCIENCE TECHNOLOGY ENGINEERING AND MATH

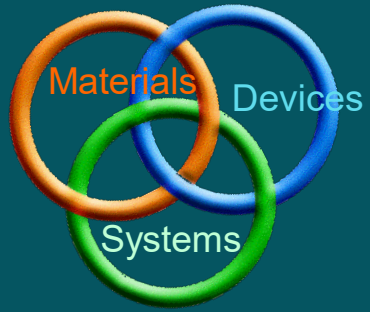
Florida SCIENCE OLYMPIAD March 30, 2019

April 13, 2019



Research Highlights

Research @ CREOL



Fundamental Science

Engineering Applications

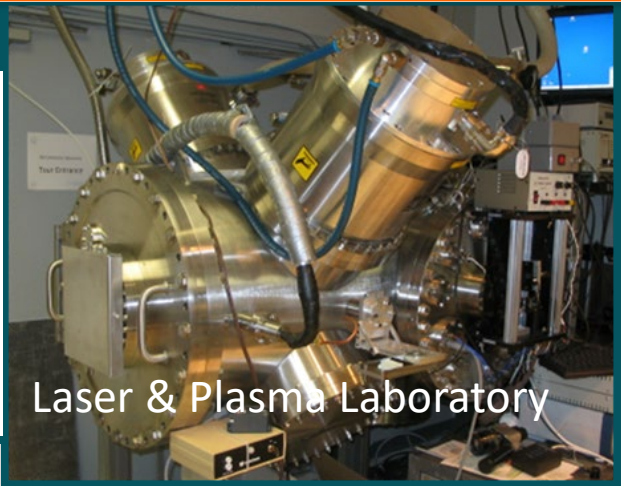
Lasers

Science & Technology

Lasers: solid-state, ceramic, semiconductor, fiber
High-Power Lasers
Optical Frequency Combs
Ultrafast Lasers
Attosecond Photonics

Applications

Manufacturing
Microfabrication
Material Processing
Biomedical



University of Central Florida

Optical ceramics

Science Home News Journals Topics Careers

Supersymmetric laser arrays

Mohammad P. Hokmabadi[1], Nicholas S. Nye[1], Ramy El-Ganainy[2], Demetrios N. Christodoulides[1], Mercedeh Khajavikhan[1,*]

Invited Talk

physicsworld

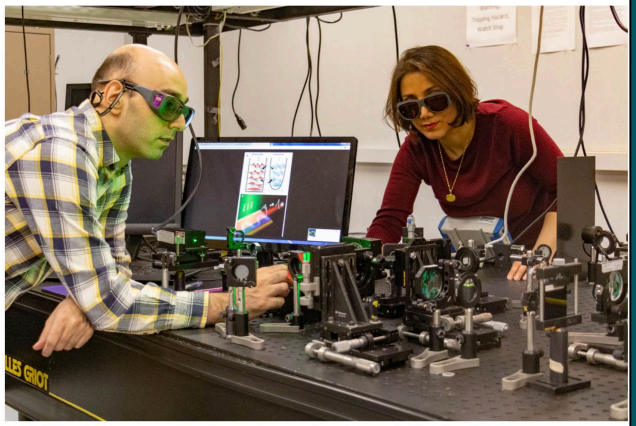
Supersymmetry boosts beam quality of laser arrays

Principles of supersymmetry have been used to boost the performance of an array of solid-state lasers. The work was led by Mercedeh Khajavikhan at the University of Central Florida in the US. Her team used ideas underpinning the speculative supersymmetry theory of particle physics to suppress unwanted high-frequency modes in their array. The result was a focussed beam intensity that is more than four times greater than achieved by conventional laser arrays.

Brilliant idea: supersymmetry could lead to better high-power integrated laser arrays. (Courtesy: iStock/Tiio)

UCF Researchers Develop First Supersymmetric Laser Array

BY ROBERT WELLS | FEBRUARY 28, 2019



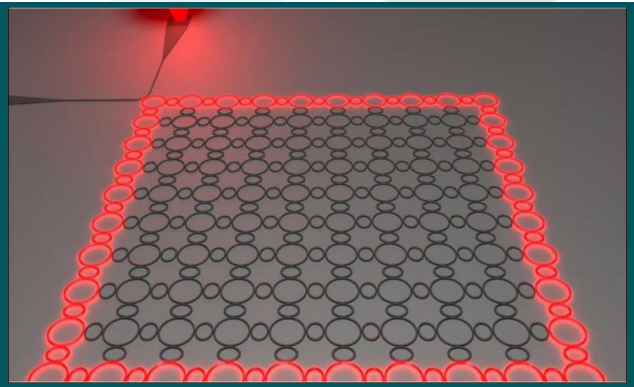
Associate Professor Mercedeh Khajavikhan and her team have developed the first supersymmetric laser array.

Topological insulator lasers

Science

Topological insulator laser: Theory

Gal Harari,* Miguel A. Bandres,* Yaakov Lumer, Mikael C. Rechtsman, Y. D. Chong, Mercedeh Khajavikhan, Demetrios N. Christodoulides, Mordechai Segev†



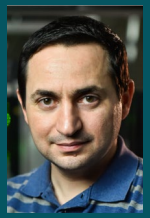
Topological insulator laser: Experiments

Miguel A. Bandres,* Steffen Wittek,* Gal Harari,* Midya Parto, Jinhan Ren, Mordechai Segev,† Demetrios N. Christodoulides,† Mercedeh Khajavikhan†

Bandres *et al.*, *Science* **359**, 1231 (2018) 16 March 2018

PHYS.ORG

Applying topological physics to lasing creates more highly efficient and robust lasers



Invited Talk

Miguel Bandres

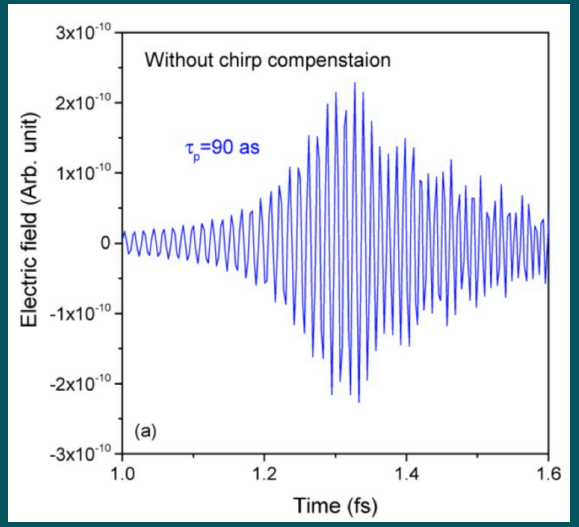
Research Article | Vol. 26, No. 25 | 10 Dec 2018 | OPTICS EXPRESS 33238

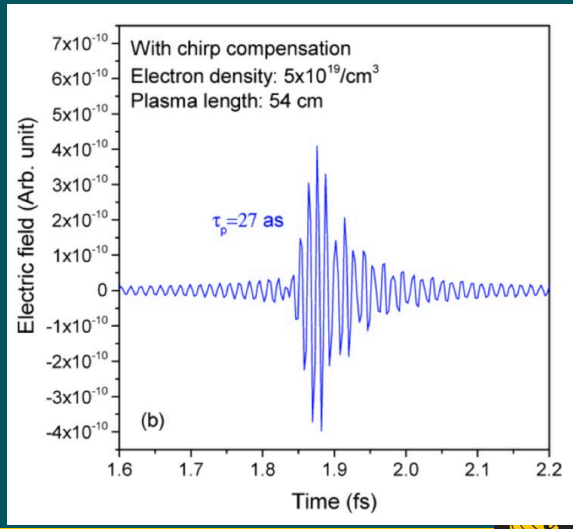
Optics EXPRESS

Attosecond chirp compensation in water window by plasma dispersion

ZENGHU CHANG[1,*]

Fully ionized hydrogen plasma can be used as a dispersive material to compensate the chirp of attosecond pulses in the 282–533 eV window





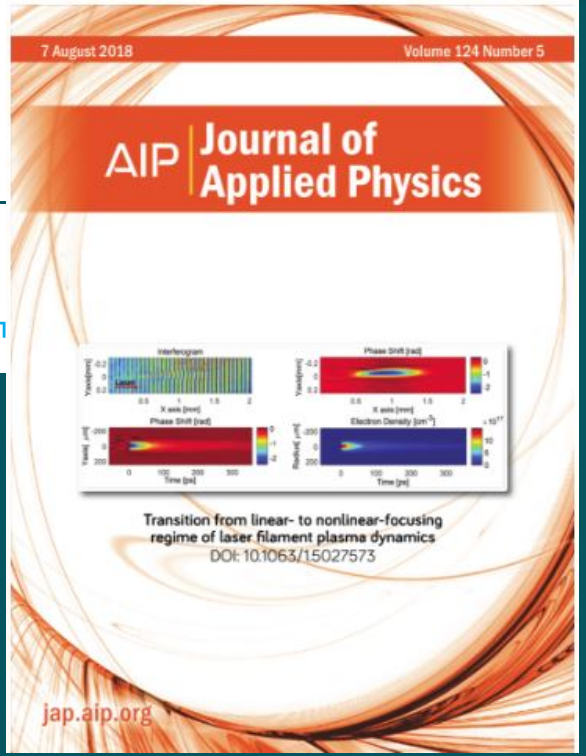
AIP Journal of Applied Physics

Transition from linear- to nonlinear-focusing regime of laser filament plasma dynamics

Journal of Applied Physics **124**, 053103 (2018); https://doi.org/10.1063/1.5027573

Danielle Reyes[1,2], Matthieu Baudelet[1,3,4], Martin Richardson[1,2,5], *and* Shermineh Rostami Fairchild[1]

High-resolution electron density measurements of plasma induced by laser filamentation demonstrate the transition from:
- linear regime (high NA): high peak density and large diameter
- nonlinear regime (long distance filamentation) low peak densities and small plasma diameter.



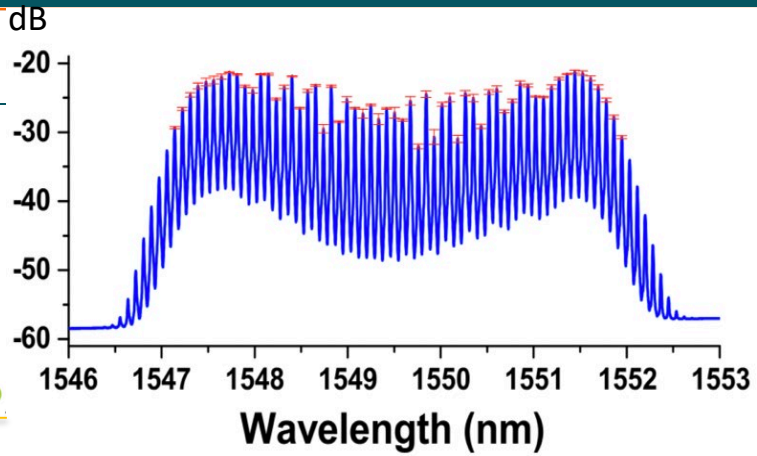
Cover feature

Frequency comb generation

IEEE PHOTONICS TECHNOLOGY LETTERS, VOL. 30, NO. 4, FEBRUARY 15, 2018

Tunable Broadband Electro-Optic Comb Generation Using an Optically Filtered Optoelectronic Oscillator

Michael E. Plascak, Ricardo Bustos Ramirez, Kristina Bagnell, and Peter J. Delfyett



Comb generation by electro-optically modulating light from CW laser using a high frequency oscillator.

In this novel configuration, the oscillator is optoelectronic: generated by detecting and filtering light from another laser.

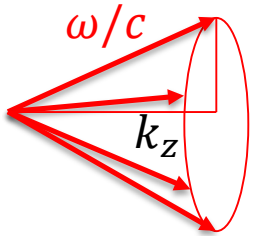
Advantage: Tunability

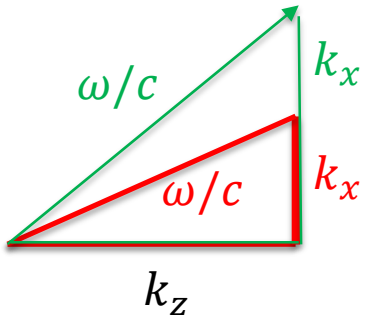
Research Article | Vol. 26, No. 16 | 6 Aug 2018 | OPTICS EXPRESS 20111

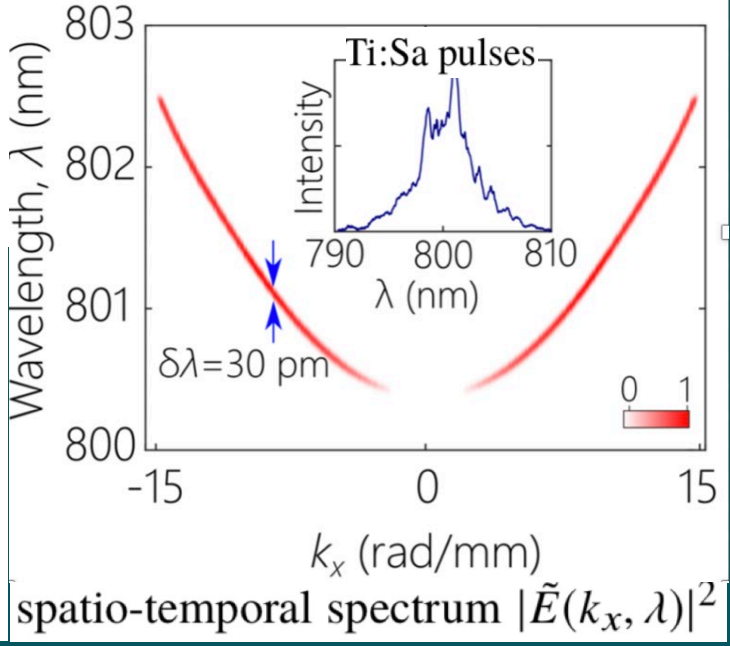
Optics EXPRESS

Meters-long propagation of diffraction-free space-time light-sheets

BASANTA BHADURI, MURAT YESSENOV, AND AYMAN F. ABOURADDY*







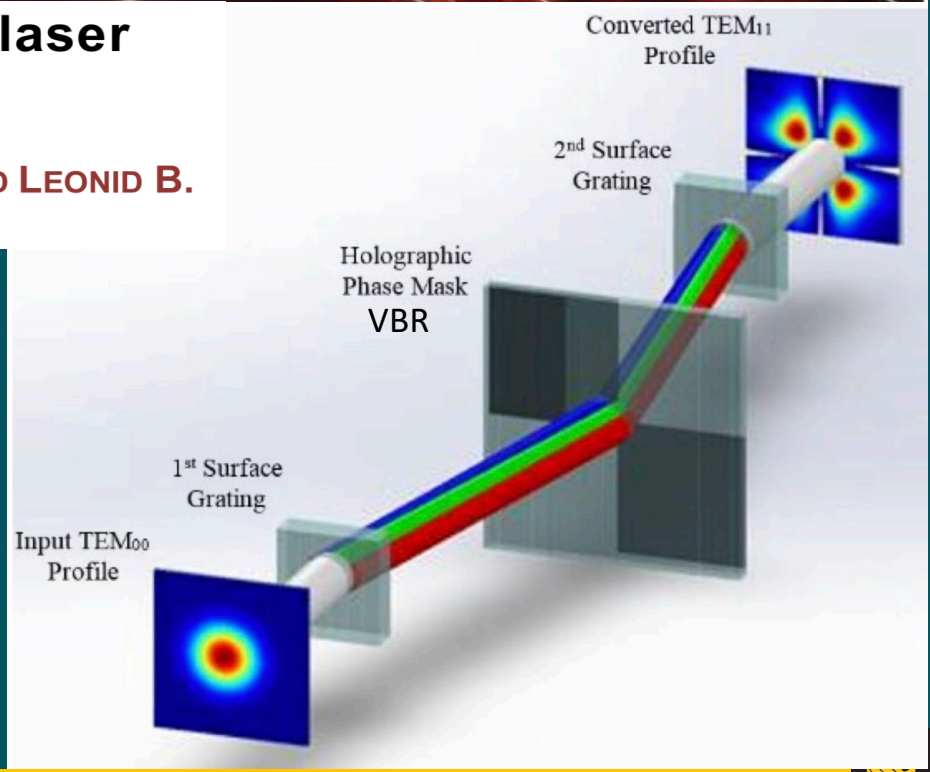
Research Article | Vol. 27, No. 1 | 7 Jan 2019 | OPTICS EXPRESS 225

Optics EXPRESS

Achromatic complex holograms for laser mode conversion

IVAN DIVLIANKSY,[1] EVAN R. HALE,[1,*] MARC SEGALL,[2] AND LEONID B. GLEBOV[1]

The volume Bragg gratings (VBR) is encoded such that each spectral component diffracted by the surface grating corresponds to a Bragg angle with the correct mode conversion hologram.



Fiber Optics

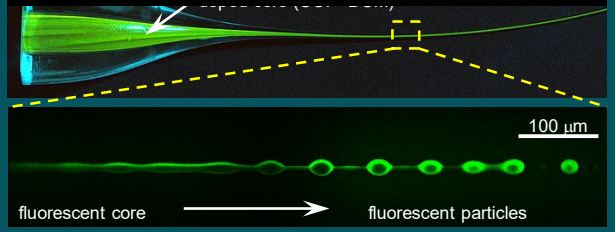
Science & Technology

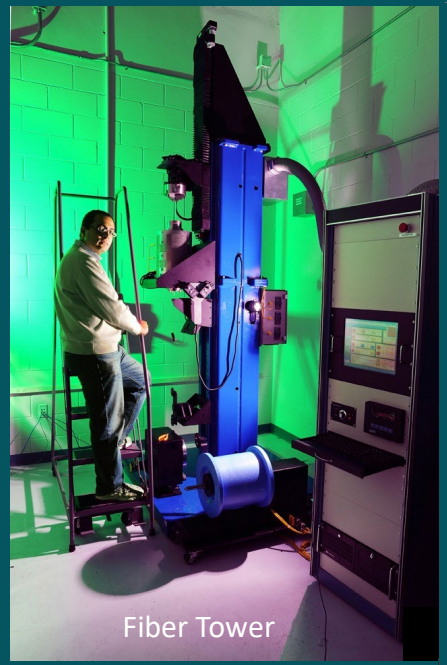
Fiber Fabrication Technology
Micro- and Nano-Structured Fibers
MIR and NIR Fibers
Fiber Lasers

Applications

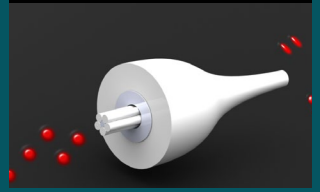
Fiber Optic Sensing
Fiber Optic Communication
Fiber Optic Networks

Fabrication of fluorescent polymer particles




Fiber Tower

Fiber Lantern




Fiber Tower

Photonic lanterns

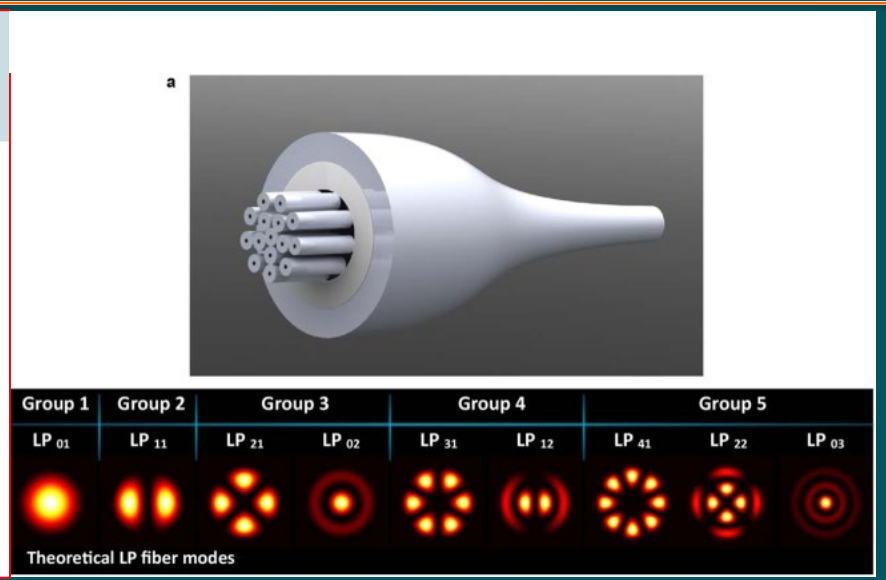
SCIENTIFIC REPORTS

Article | OPEN | Published: 11 June 2018

Scaling photonic lanterns for space-division multiplexing

Amado M. Velázquez-Benítez, J. Enrique Antonio-López, Juan C. Alvarado-Zacarías, Nicolas K. Fontaine, Roland Ryf, Haoshuo Chen, Juan Hernández-Cordero, Pierre Sillard, Chigo Okonkwo, Sergio G. Leon-Saval & Rodrigo Amezcua-Correa

Scientific Reports **8**, Article number: 8897 (2018) | Download Citation



Demonstration of mode-selective lanterns supporting 15 spatial channels by use of GRIN fibers & microstructured templates for efficient mode sampling & conversion.

Space-division multiplexing (SDM) in fibers

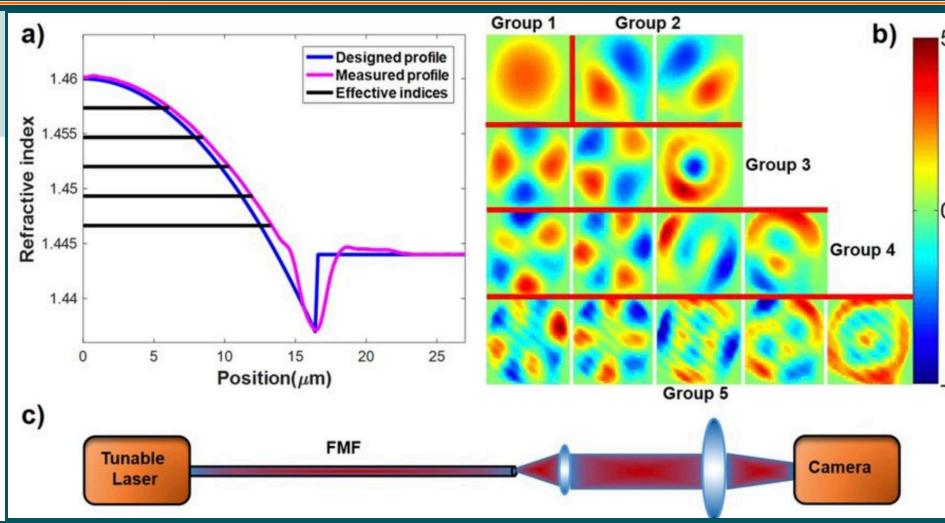
SCIENTIFIC REPORTS

Article | OPEN | Published: 01 March 2018

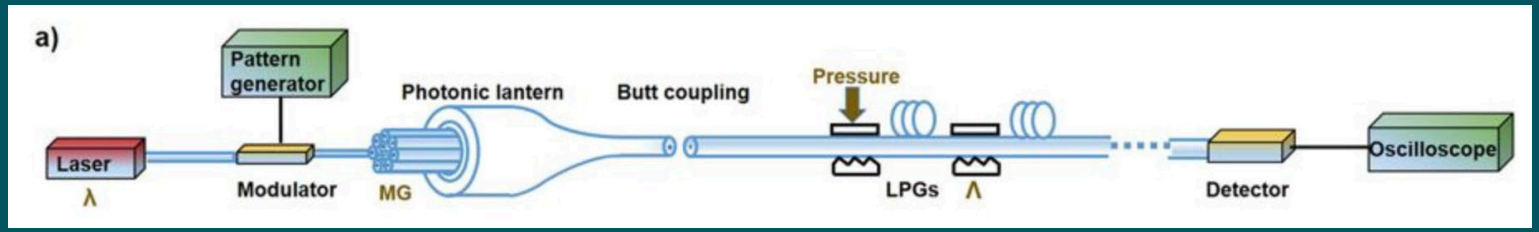
Reducing group delay spread using uniform long-period gratings

Huiyuan Liu, He Wen, Bin Huang, Rodrigo Amezcua Correa, Pierre Sillard, Haoshuo Chen, Zhihong Li & Guifang Li

Scientific Reports **8**, Article number: 3882 (2018) | Download Citation



Crosstalk in SDM requires complex DSP. This can be alleviated by inducing strong mode coupling and reducing group delay spread by means of long-period gratings (LPG) and optimized index profile.

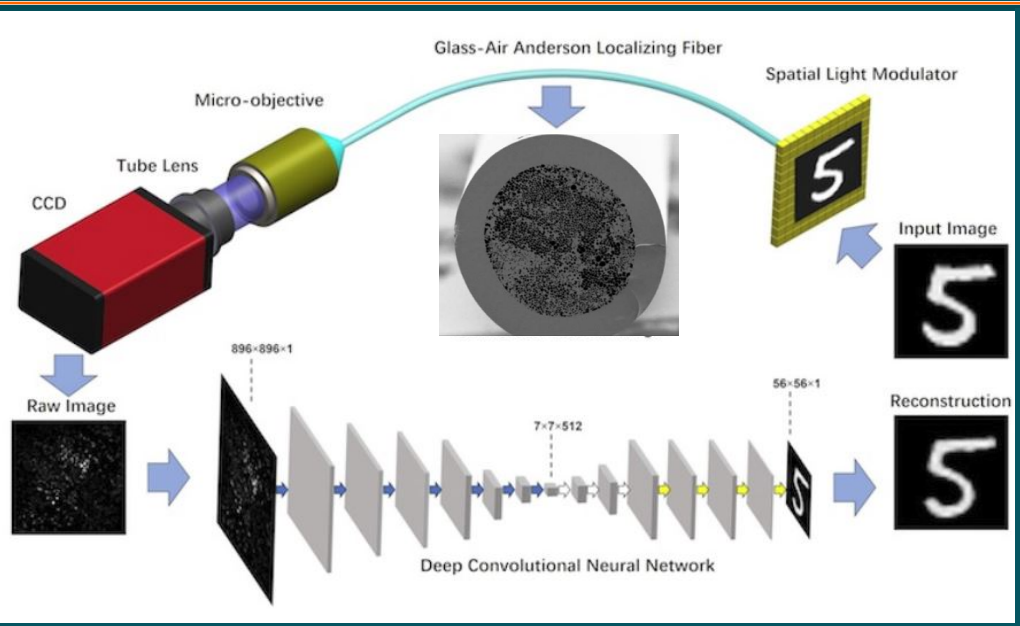


Disordered fibers: Imaging & generation of high-quality wavefronts

SCIENTIFIC REPORTS

Image Transport Through Meter-Long Randomly Disordered Silica-Air Optical Fiber

Jian Zhao ✉, Jose Enrique Antonio Lopez, Zheyuan Zhu, Donghui Zheng, Shuo Pang, Rodrigo Amezcua Correa & Axel Schülzgen



Letter Vol. 5, No. 8 / August 2018 / Optica 984

optica

Disorder-induced high-quality wavefront in an Anderson localizing optical fiber

Behnam Abaie,[1,2] Mostafa Peysokhan,[1,2] Jian Zhao,[3] Jose E. Antonio-Lopez,[3] Rodrigo Amezcua-Correa,[3] Axel Schülzgen,[3] and Arash Mafi[1,2,*]

One of top downloads for Aug 2018

physicsworld

Deep Learning Imaging through Fully-Flexible Glass-Air Disordered Fiber

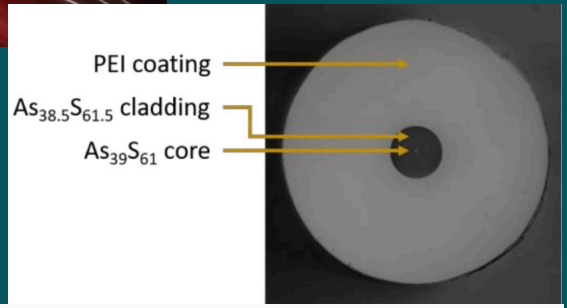
Jian Zhao*†, Yangyang Sun†, Zheyuan Zhu, Jose Enrique Antonio-Lopez, Rodrigo Amezcua Correa, Shuo Pang, and Axel Schülzgen
CREOL, The College of Optics and Photonics, University of Central Florida, Orlando, Florida 32816, United States

Research Article | Vol. 26, No. 6 | 19 Mar 2018 | OPTICS EXPRESS 7313

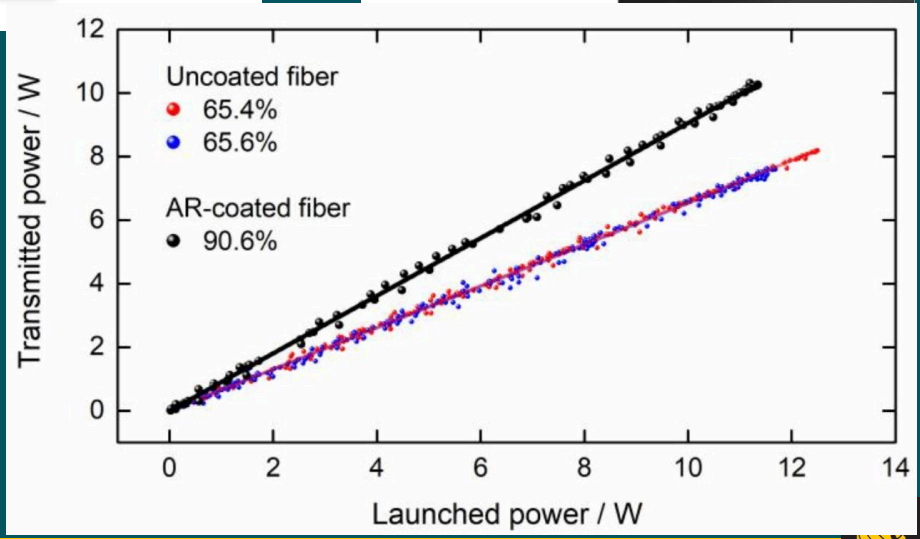
Optics EXPRESS

High power single-mode delivery of mid-infrared sources through chalcogenide fiber

A. Sincore,[1,*] J. Cook,[1] F. Tan,[1] A. El Halawany,[1] A. Riggins,[1] S. McDaniel,[2,3] G. Cook,[3] D. V. Martyshkin,[4,5] V. V. Fedorov,[4,5] S. B. Mirov,[4,5] L. Shah,[1,6] A. F. Abouraddy,[1] M. C. Richardson,[1] and K. L. Schepler[1]



>10 W
mid IR (2.5 μm)
over 20-cm length
90 % transmission



Textile Industry's First Active, User-Controlled Color-Changing Fabric

ChroMorphous technology: an active, user-controlled color-changing fabric.

The fabric is embedded with metal micro-wires that carry an electric current through the threads, causing pigments in the threads to change color in response to the push of a button.

Ayman Abouraddy

Mashable

FINANSTER

cnet

VB

Orlando Sentinel

engadget

CNBC

west

DIGITAL TRENDS

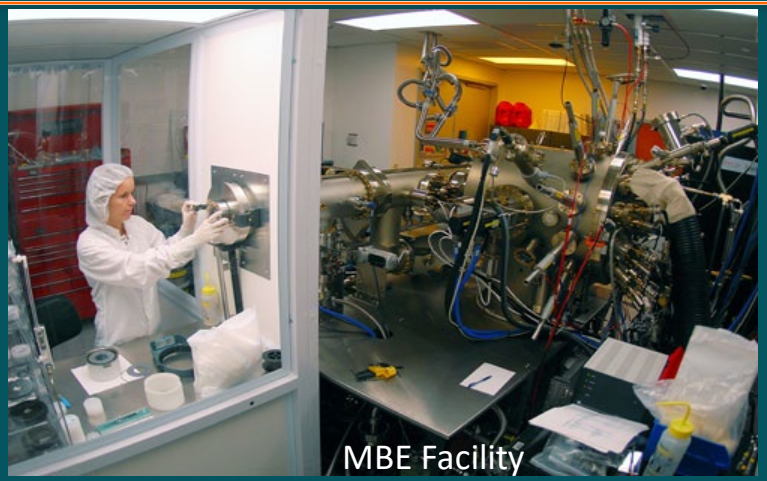
Optoelectronics & Integrated Photonics

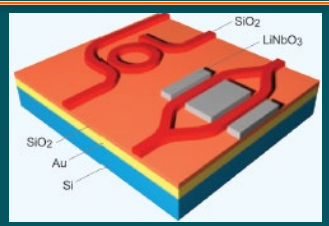
Science & Technology

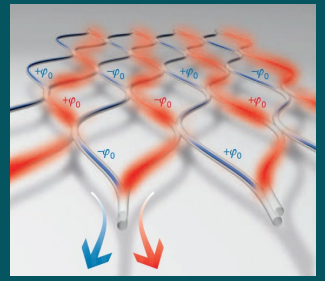
- III-V Semiconductor Devices, QCL
- Quantum Dot & VCSL Technology
- Oxide Semiconductor Devices
- Organic Semiconductor Devices
- Photovoltaics
- Silicon Photonics
- Flexible Glass Integrated Photonics
- Periodic Structures & Metamaterials
- Nanoparticle & Nanowire Synthesis
- 3D Nanofabrication
- Plasmonics
- Gratings & Holographic Optical Elements

Applications

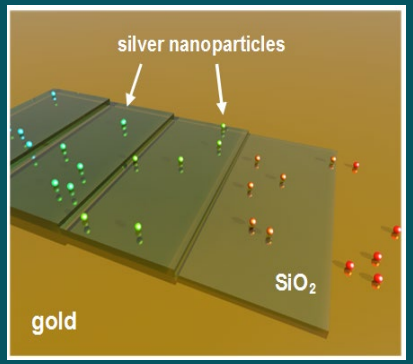
- Optical Communication
- Optical Processing & Switching
- Solar Energy Applications
- Integrated-Optic Sensing
- Integrated-Optic Signal Processing
- Medical Applications of Nanophotonics


MBE Facility






Nanophotonics Fabrication Facility



UCF

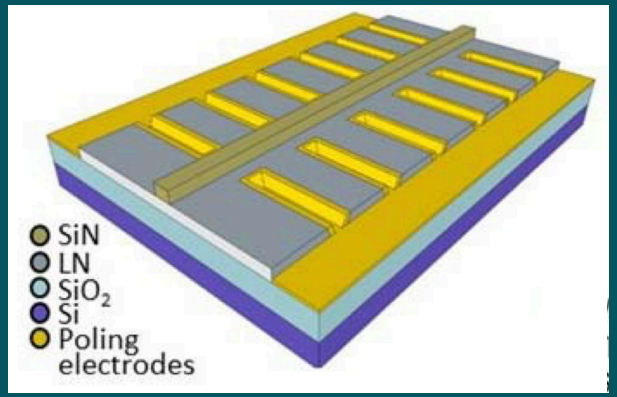
IEEE JOURNAL OF QUANTUM ELECTRONICS, VOL. 54, NO. 6, DECEMBER 2018 6300716

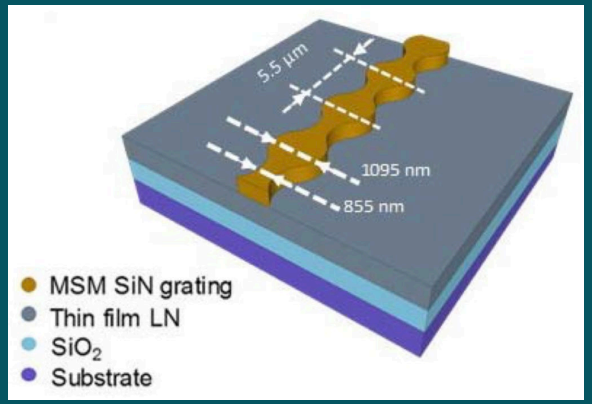
Heterogeneous Nonlinear Integrated Photonics

Sasan Fathpour, *Senior Member, IEEE*

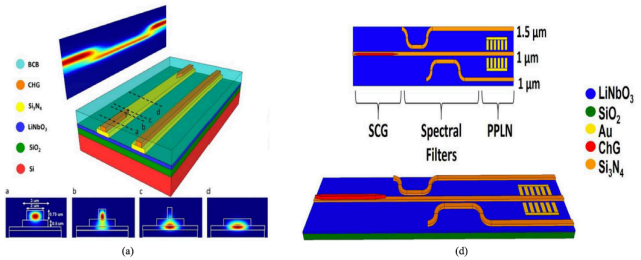
(Invited Papers)

Fathpour has pioneered integration of ultracompact photonic devices & circuits formed on submicron films of lithium niobate and compound semiconductors on silicon substrates. He has demonstrated optical modulators and SHG using PPLN





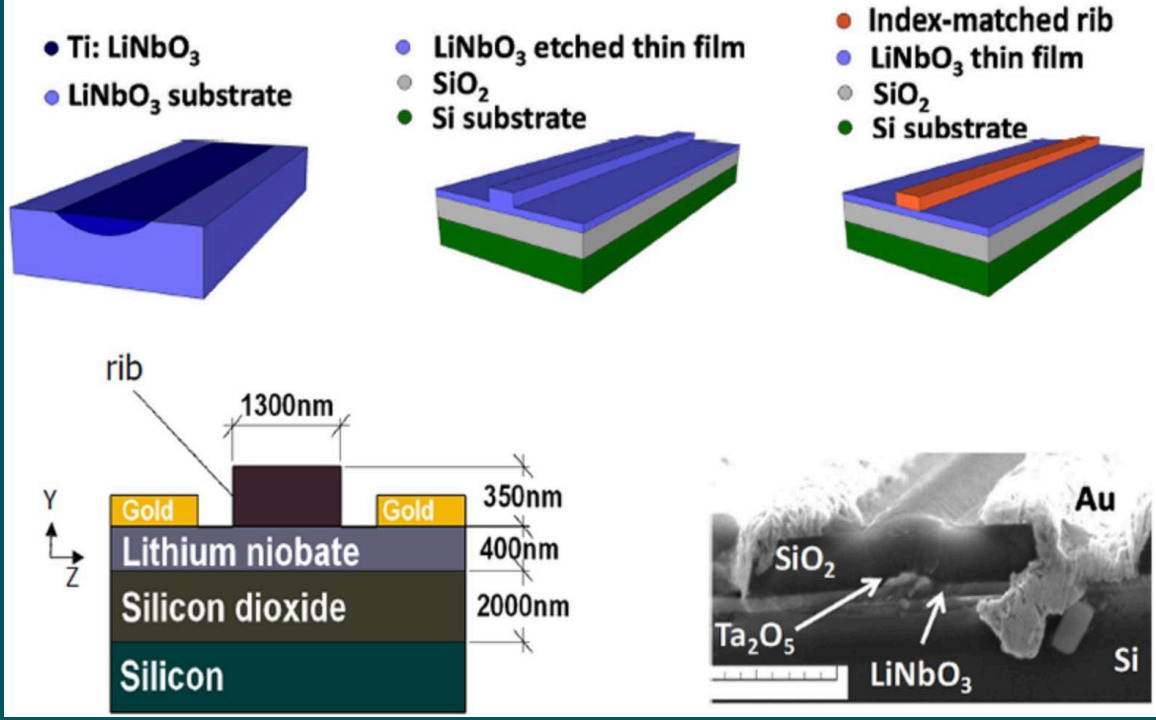
IEEE JOURNAL OF
QUANTUM ELECTRONICS
A PUBLICATION OF THE IEEE PHOTONICS SOCIETY
IEEE Photonics Society
DECEMBER 2018 VOLUME 54 NUMBER 6 IEJQA7 (ISSN 0018-9197)



(a) Design and simulation of ultracompact LiNbO3-on-Si waveguide integrated with ChG waveguides via vertical waveguide couplers mediated by a SiN layer in between [133]; (d) Conceptual fully-integrated ChG-LiNbO3 circuit for frequency-stabilized optical comb generation application. See "Heterogeneous Nonlinear Integrated Photonics." (Fathpour, Article #6300716).

PICMagazine August 2018 Issue

"Thinking beyond conventional silicon photonics" by Sasan Fathpour



Semiconductor nanomembrane photodetectors

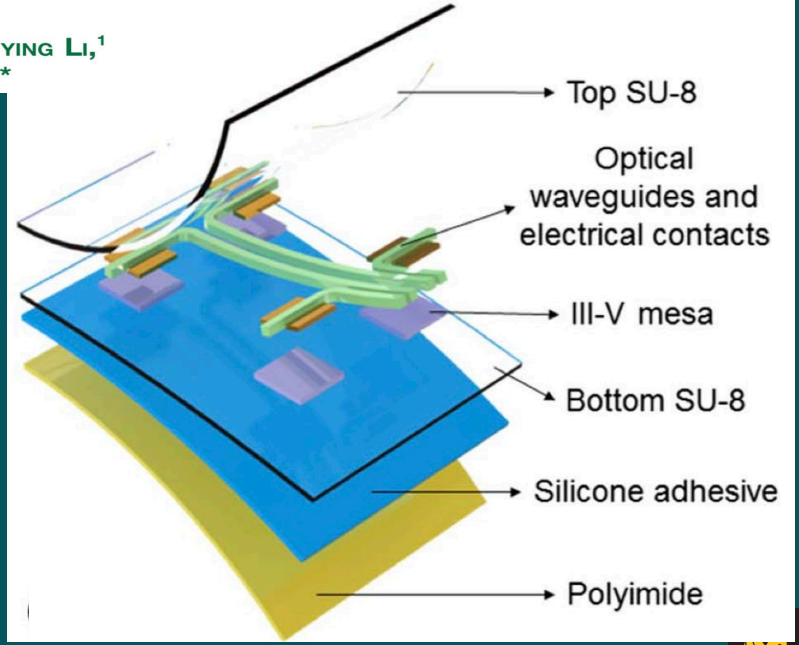
Research Article Vol. 5, No. 1 / January 2018 / Optica 44

optica

High-performance flexible waveguide-integrated photodetectors

Lan Li,[1,4,†] Hongtao Lin,[1,†] Yizhong Huang,[1] Ren-Jye Shiue,[2] Anupama Yadav,[3] Junying Li,[1] Jerome Michon,[1] Dirk Englund,[2] Kathleen Richardson,[3] Tian Gu,[1] and Juejun Hu[1,*]

Semiconductor nanomembrane photodetectors integrated with single-mode chalcogenide glass waveguide in a multilayer laminated configuration. 1.4 GHz bandwidth at 1530 nm.



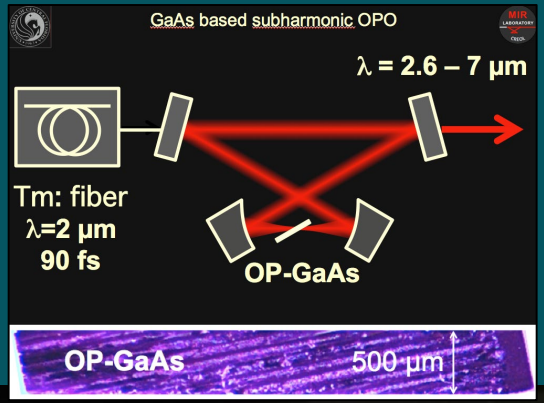
Nonlinear & Quantum Optics

Science & Technology

- Nonlinear Optical Materials
- Parametric & Multiphoton Processes
- High Harmonic Generation
- Nonlinear Waveguides & Lattices
- Spatial & discrete solitons
- Quantum Information

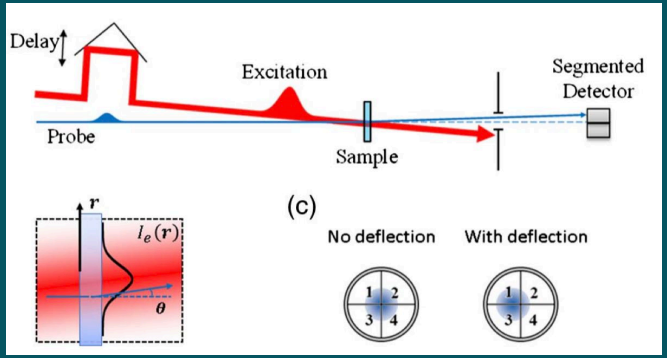
Applications

Switching and signal processing
Metrology
Spectroscopy and Material Identification
Laser Protectors
Quantum Communication & Sensing



Measurement of nonlinear optical properties

The Z-scan & beam-deflection methods invented by Van Stryland & Hagan have been used for precision measurement of nonlinear refraction (including temporal & polarization dependence), of various materials



Research Article Vol. 5, No. 5 / May 2018 / Optica 583

optica

Temporal and polarization dependence of the nonlinear optical response of solvents

Peng Zhao,[1] Matthew Reichert,[1,2] Sepehr Benis,[1] David J. Hagan,[1,3] and Eric W. Van Stryland[1,3,*]

Invited Talk

SCIENTIFIC REPORTS

Engineered nonlinear materials using gold nanoantenna array

Vladimir P. Drachev ✉, Alexander V. Kildishev, Joshua D. Borneman, Kuo-Ping Chen, Vladimir M. Shalaev, Konstantin Yamnitskiy, Robert A. Norwood, Nasser Peyghambarian, Seth R. Marder, Lazaro A. Padilha, Scott Webster, Trenton R. Ensley, David J. Hagan & Eric W. Van Stryland

Scientific Reports **8**, Article number: 780 (2018) | Download Citation ⬇

MIR Frequency Combs

nature photonics

Massively parallel sensing of trace molecules and their isotopologues with broadband subharmonic mid-infrared frequency combs,

A. V. Muraviev, V. O. Smolski, Z. E. Loparo & K. L. Vodopyanov

Nature Photonics **12**, 209–214 (2018)

New platform for MIR dual-comb Fourier-transform spectroscopy, based on a pair of ultra-broadband subharmonic OPOs pumped by two phase-locked thulium fiber combs

New laser technique may help detect chemical warfare in atmosphere

ScienceDaily
Your source for the latest research news

PHYS.ORG

ChemInfo

R&D

Laboratory EQUIPMENT

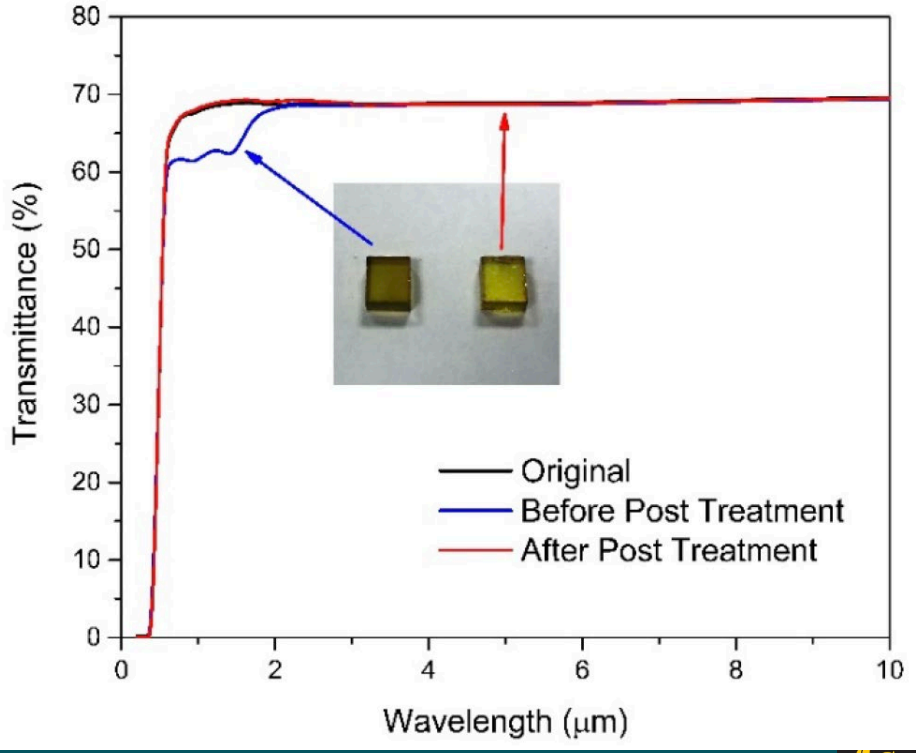
Research Article | Vol. 9, No. 2 | 1 Feb 2019 | OPTICAL MATERIALS EXPRESS 400

Optical Materials EXPRESS

Non-stoichiometric grain-growth in ZnSe ceramics for $\chi^{(2)}$ interaction

X. CHEN[1,2,*] AND R. GAUME[1,2,3]

Fabrication of ZnSe ceramics with a grain-size matching the optical coherence length enables three-wave mixing via random quasi-phase-matching



3D Multiphoton lithography

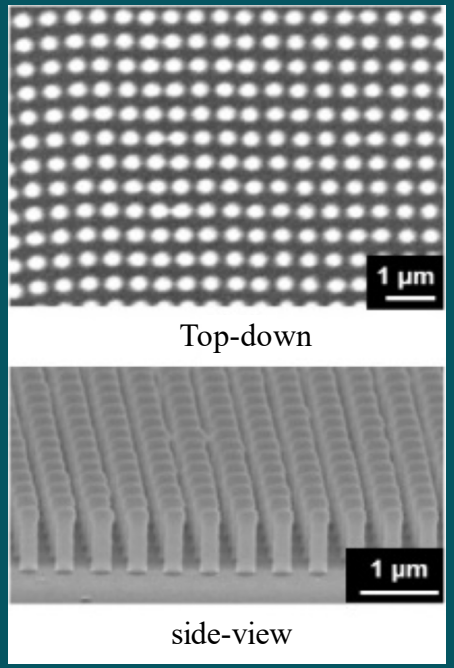
Research Article | Vol. 8, No. 7 | 1 Jul 2018 | OPTICAL MATERIALS EXPRESS 1902

Optical Materials EXPRESS

Processing and fabrication of micro-structures by multiphoton lithography in germanium-doped arsenic selenide

Casey M. Schwarz,[1,2] Chris N. Grabill,[1] Gerald D. Richardson,[1] Sherya Labh,[1] Benn Gleason,[3,4] Clara Rivero-Baleine,[5] Kathleen A. Richardson,[4] Alexej Pogrebnyakov,[6] Theresa S. Mayer,[6] and Stephen M. Kuebler[1,4,*]

Invited Talk



SEM images of nano-pillars fabricated by MPL in thermally deposited As_2S_3

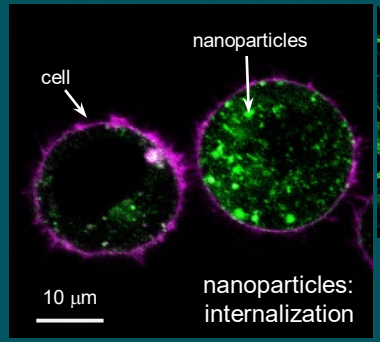
Imaging, Sensing & Display

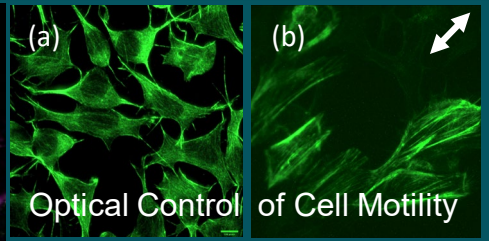
Science & Technology

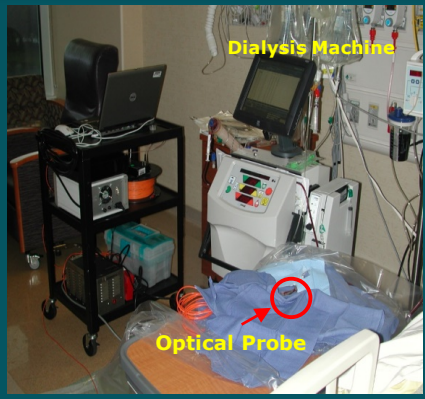
- Nanophotonic & Plasmonic Sensors
- IR Sensors, Spectroscopy
- Actuators (Optical Forces)
- Near Field Imaging
- Fluorescence Nanoscopy
- X-ray & EUV Imaging
- Single-Molecule Imaging
- Computational Imaging
- Imaging Through Random Media
- Liquid Crystal Technology

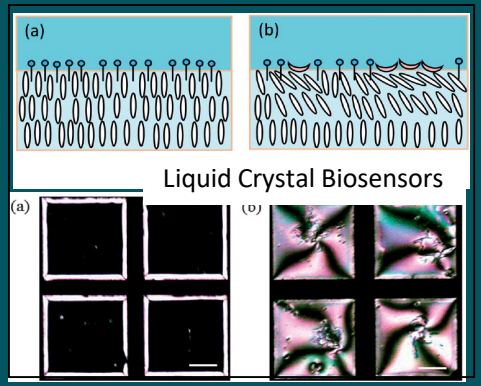
Applications

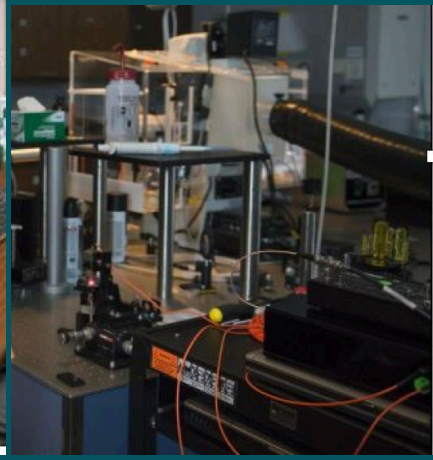
Sensing & metrology
Biology & medicine
Display









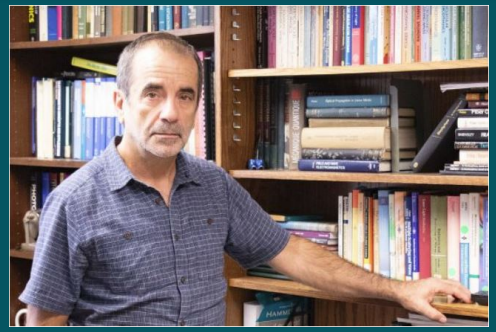


nature COMMUNICATIONS

Article | OPEN | Published: 07 September 2018

Passive sensing around the corner using spatial coherence

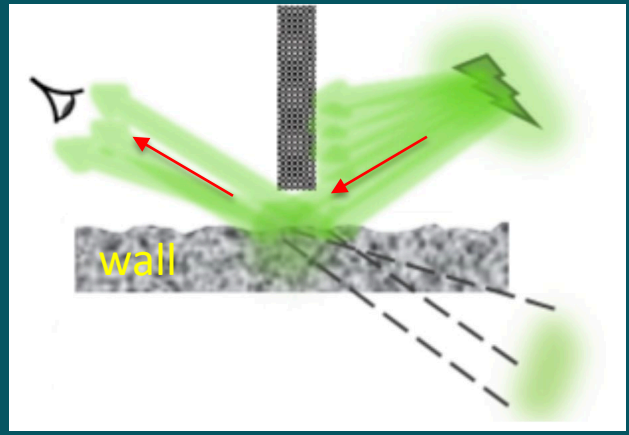
M. Batarseh, S. Sukhov, Z. Shen, H. Gemar, R. Rezvani & A. Dogariu



UCFTODAY

New Understanding of Light Allows Researchers to See Around Corners

A highly scattering wall can transfer certain statistical properties of light that assist in detecting non-line-of-sight objects illuminated by natural light



X-ray diffraction tomography

Research Article Vol. 5, No. 6 / June 2018 / Optica 733

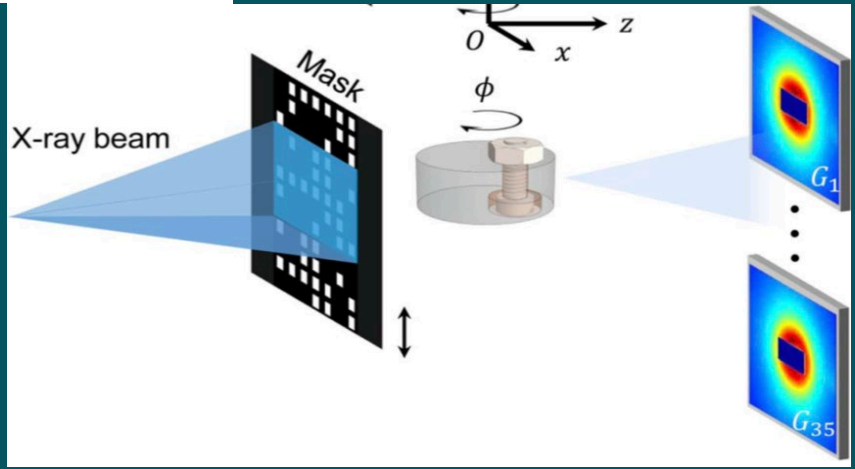
optica

Coded cone-beam x-ray diffraction tomography with a low-brilliance tabletop source

ZHEYUAN ZHU, RYAN A. ELLIS, AND SHUO PANG*

The multiplexing & parallelization advantage of coded-illumination in XDT enhances contrast & reduces acquisition time (x10), without need of a high-brilliance synchrotron source:

Apps: Medical imaging & industrial nondestructive testing



Research Article Vol. 5, No. 9 / September 2018 / Optica 1063

optica

Extended field-of-view single-molecule imaging by highly inclined swept illumination

JIALEI TANG AND KYU YOUNG HAN*

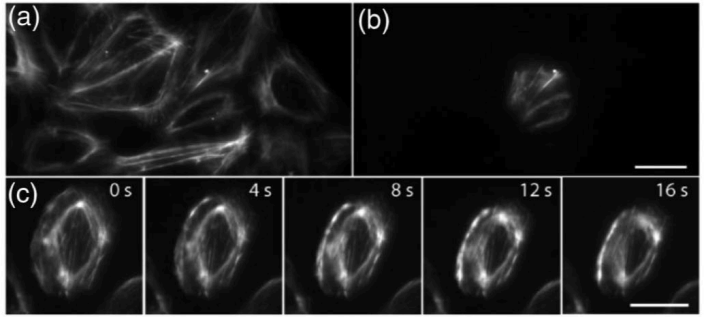
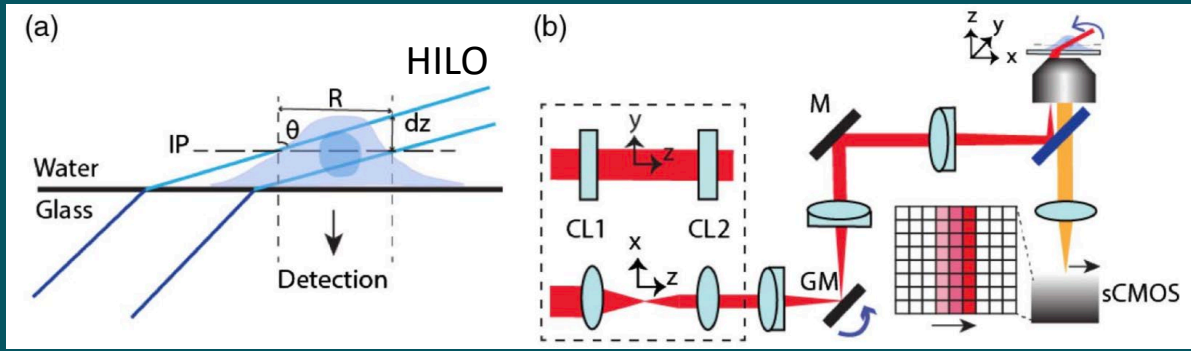


Fig. 6. Live-cell imaging. Images of actin in U2OS cells with (a) HIST and (b) HILO illumination. (c) Time-lapse imaging with HIST microscopy reveals a shrinkage of U2OS cells after treatment with trypsin-EDTA. The average power was ~5 W/cm^2 and the integration time was 1/23 s. Scale bars, 20 μm.

Sheet illumination microscopy by use of thin & highly inclined, laminated optical sheet (HILO)

enables clear wide field-of-view, high signal-to-background, 3D single-molecule imaging of sub-cellular structures.



Liquid crystal technology

Research Article | Vol. 27, No. 4 | 18 Feb 2019 | OPTICS EXPRESS 4480

Optics EXPRESS

Photo-responsive dye-doped liquid crystals for smart windows

JAVED ROUF TALUKDER, YUN-HAN LEE, AND SHIN-TSON WU*

A new polarizer-free photo-activated smart dimmer

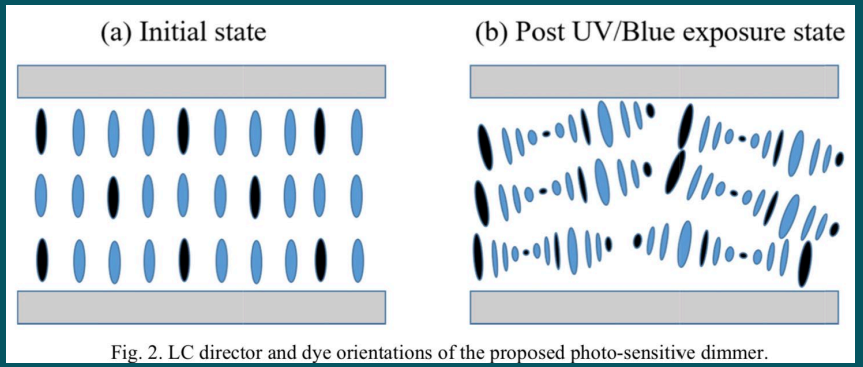


Fig. 2. LC director and dye orientations of the proposed photo-sensitive dimmer.

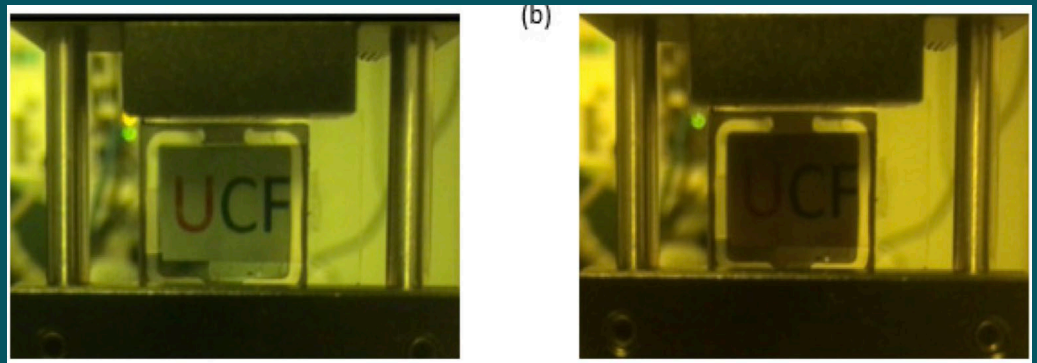


Fig. 4. See-through image of our smart dimmer: (a) before and (b) after UV exposure. The dynamic transition is recorded in Visualization 1.

LCD vs OLED

Light | Science & Applications

Light Sci Appl. 2018; 7: 17168. PMCID: PMC6060049

Liquid crystal display and organic light-emitting diode display: present status and future perspectives

Hai-Wei Chen,[1] Jiun-Haw Lee,[2] Bo-Yen Lin,[2] Stanley Chen,[3] and Shin-Tson Wu[1,*]

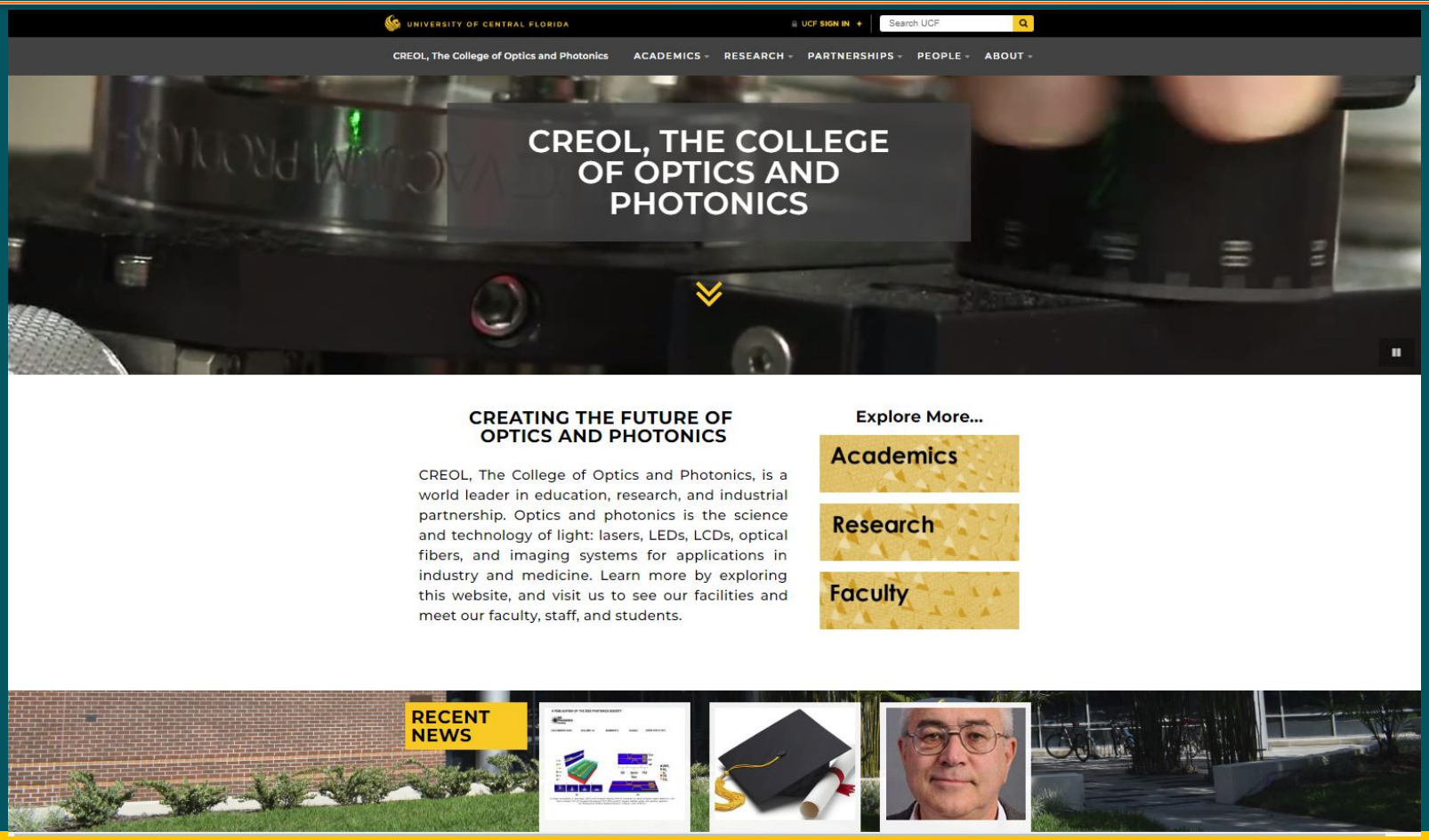
- LCDs are leading in lifetime, cost, resolution density and peak brightness
- LCDs are comparable to OLEDs in ambient contrast ratio (ACR), viewing angle, power consumption and, color gamut (with QD-based backlights);
- LCDs and are inferior to OLED in black state, panel flexibility and response time.

CREOL Institutional Issue in Applied Optics

Guest Editors: A. Schülzgen, S. Pang

Target: Issue May 2019

. . . & much more. See updates & news & events on website




CREOL
Thank you