华侨华人创业发展洽谈会组委会办公室

Conference on Overseas Chinese Pioneering and Developing in China 2022—International Youth Talent Summit
Wuhan, China, Nov. 16 2022

Contribution of Hubei province and Saratov region to world achievements and training of young talents in the field of biophotonics

Valery V. Tuchin

Saratov State University
National Research Tomsk State University
ITMO University
Institute of Precision Mechanics and Control of the RAS
Bach Institute of Biochemistry, Federal Research Centre 'Fundamentals of Biotechnology' of the RAS, Russia

tuchinvv@mail.ru


SPIE Short Course-Optical Clearing
Huazhong University of Science and Technology
China
華中科技大學
WUHAN NATIONAL LABORATORY FOR OPTOELECTRONICS
Saratov State University
Division of Optics & Biophotonics
Research-Educational Institute of Optics & Biophotonics
University of Oulu, Finland

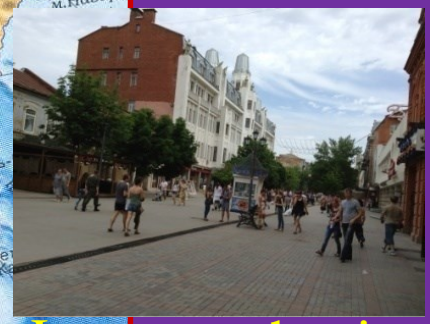
Saratov, SSU

Saratov accordion

Не быть тебе в Москве, не жить тебе с людьми.
Подалее от этих хватов,
В деревню, к тетке, в глушь, в Саратов,
Там будешь горе горевать,

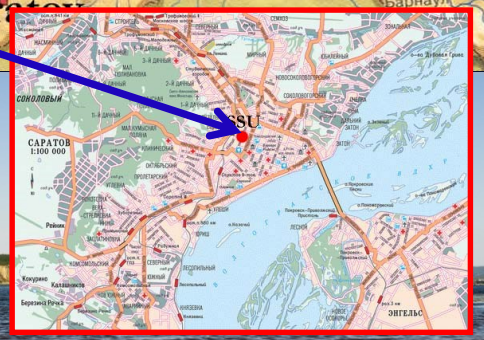
Griboedov – Russian writer:
Do not you be in Moscow, you can not live with people…
In the village, to your aunt, in the wilderness, in Saratov…

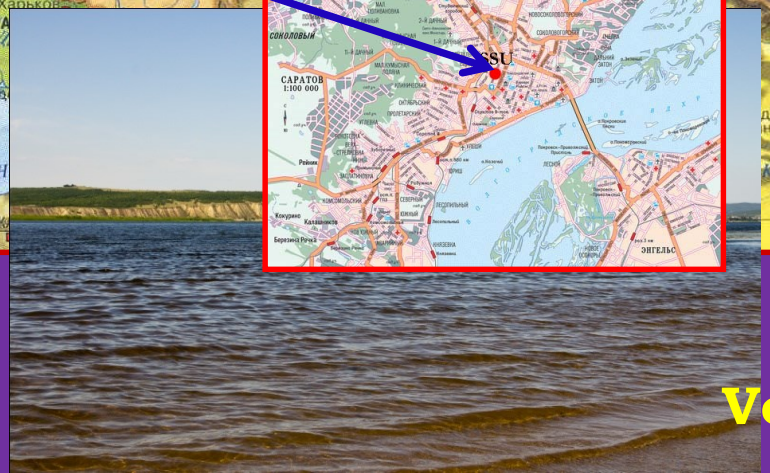
Song about love



Longest pedestrian street

Conservatory



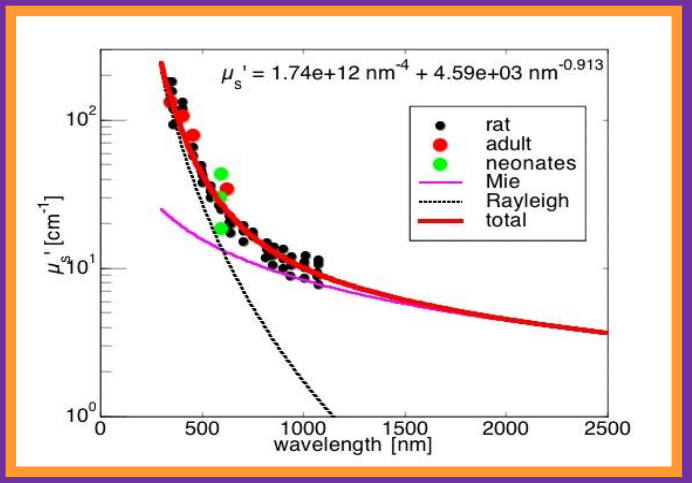


Volga-river

Special bread - Kalach

The first cosmonaut
Yuri Gagarin
studied and landed in Saratov
in 1961

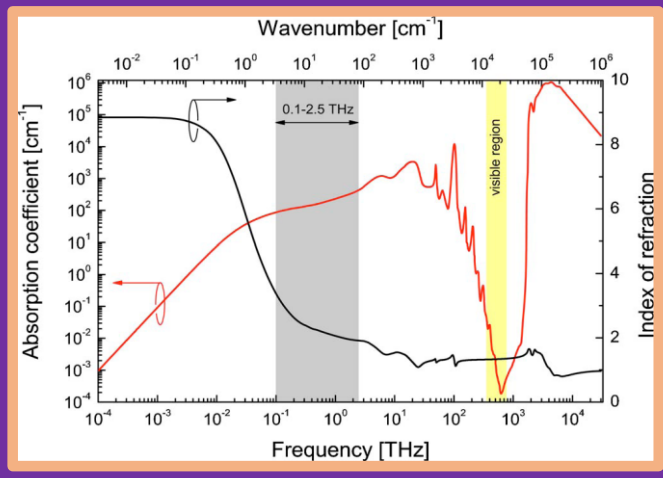
Approx. since that time Hubei province and Saratov region have established links and collaboration



Optical clearing method helps to reduce scattering of tissues

$$\mu_s' = \mu_s(1-g) \sim d^2\rho(d/\lambda)^{0.37}(m-1)^2$$

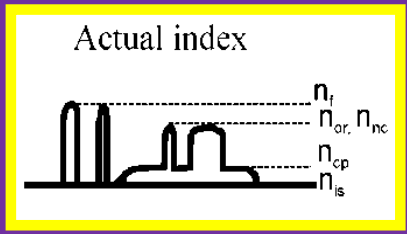
$$m \equiv n_s/n_0$$



Refractive index matching mechanism

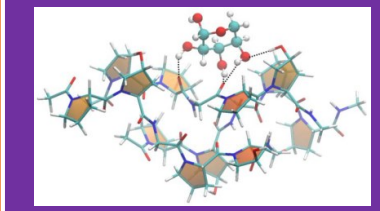
Dehydration mechanism

Optical clearing agents



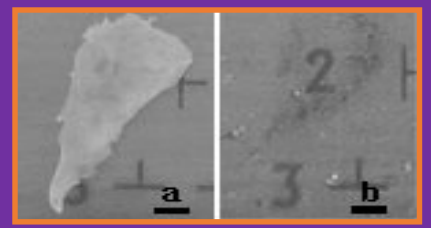
Hyperosmotic agents:

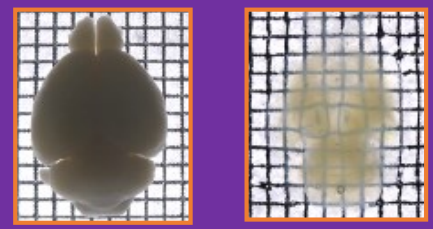
- **Glucose**
- Sorbitol
- **Glycerol**
- Polyethylene glycol
- Propylene glycol
- Dimethyl sulfoxide



Isosmotic solutions:

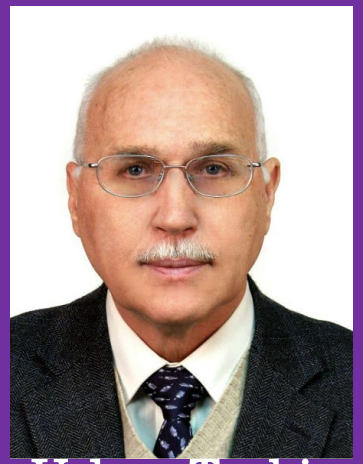
- X-ray contrast agents: iohexol, iodixanol
- MRI contrast agents: gadobutrol, etc.





Zhu Lab: Tissue optical clearing

Dan Zhu
Wuhan National Laboratory for Optoelectronics, Huazhong University of Science and Technology
China



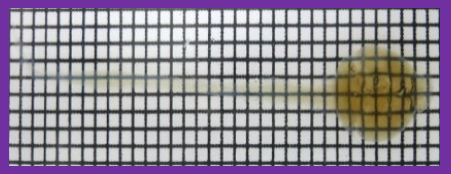
Valery Tuchin
Saratov State University
Russia

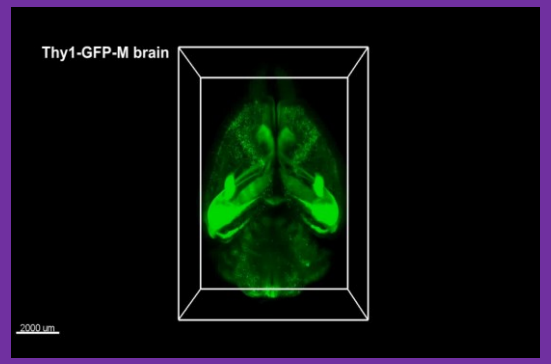
Molecular mechanism

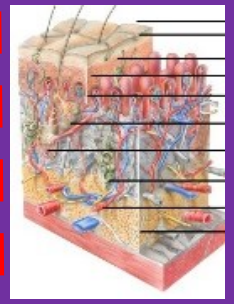
Physical mechanism → High-efficient OCAs ← Physiological mechanism

In vitro optical clearing methods

More rapid
More effective
More versatile



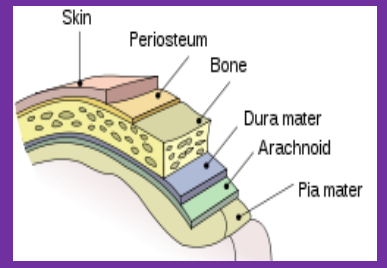


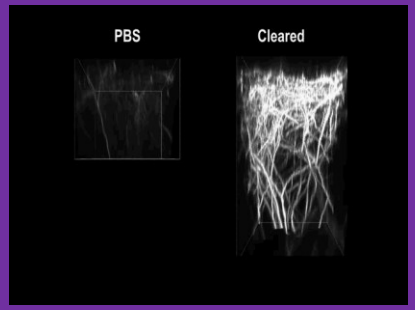


In vivo optical clearing methods

Biocompatibility&
Skin safety Skull

Enhancing:
performance vascular
& cell imaging





Chinese-Russian Workshops on Biophotonics and Biomedical Optics 2006-2022

The first Russian-Chinese Workshop on Biophotonics and Biomedical Optics “BBO-06” was held in Wuhan, P.R. China, September 2-3, 2006.

Chinese-Russian Workshop on Biophotonics and Biomedical Optics-2011 was held in Wuhan, China, on Nov. 1-3, 2011

TOPICAL PROBLEMS OF BIOPHOTONICS

JULY 27-31, 2019

"Konstantin Korotkov" boat, Nizhny Novgorod – Uglich - Nizhny Novgorod

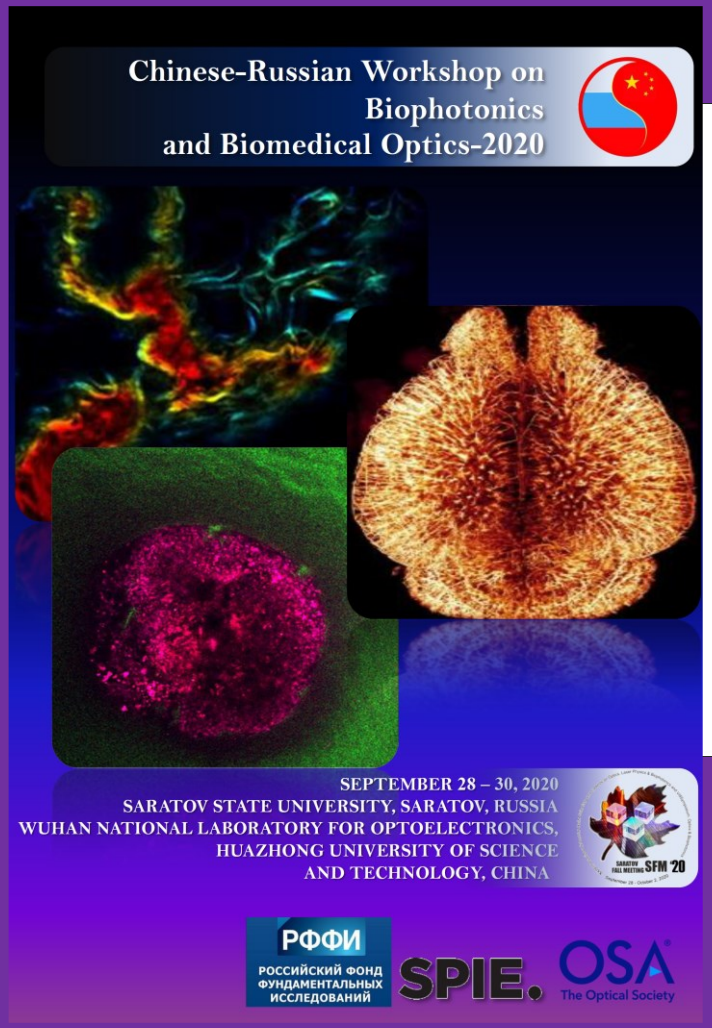
RUSSIAN-CHINESE WORKSHOP ON BIOPHOTONICS & BIOMEDICAL OPTICS

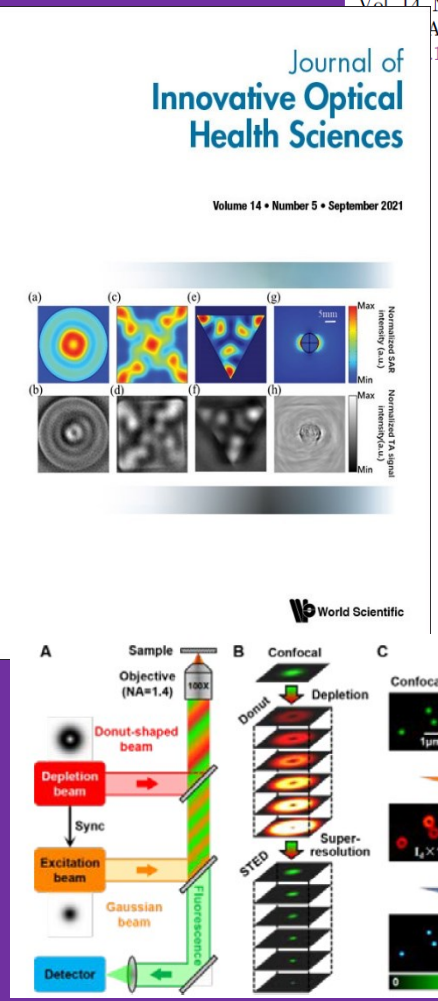
CHAIRS

- Dan Zhu, Wuhan National Laboratory for Optoelectronics, Huazhong University of Science and Technology
- Valery Tuchin, Saratov State University, Russia

JULY 27-31, 2019

"Konstantin Korotkov" boat, Nizhny Novgorod – Uglich - Nizhny Novgorod





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Author(s)
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Editorial

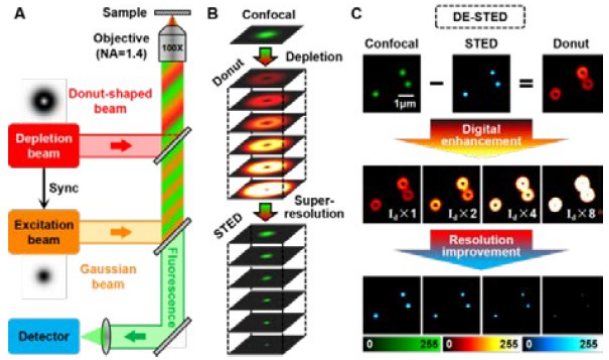
Introduction to the Special Issue on Advances in Biophotonics and Biomedical Optics

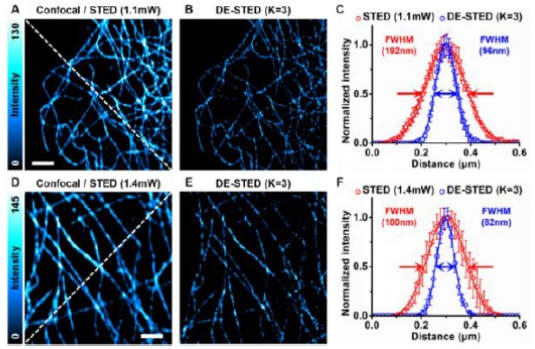
Polina Dyachenko (Timoshina)*, Tingting Yu†,‡, Dan Zhu†,‡ and Valery V. Tuchin*

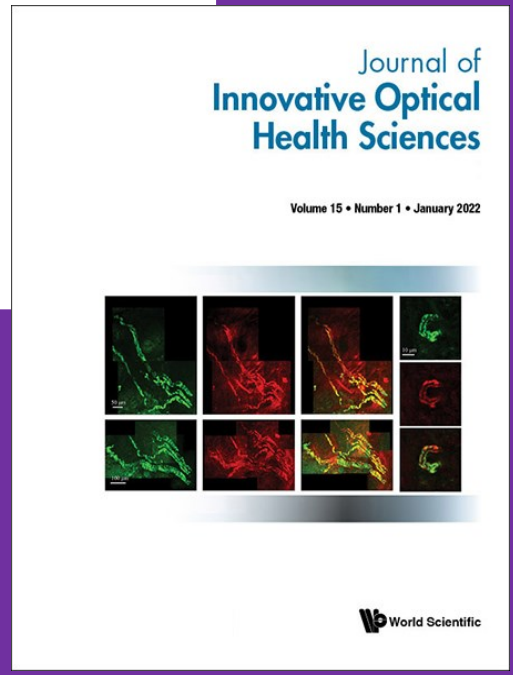
*Research-Educational Institute of Optics and Biophotonics
Saratov State University, Saratov 410012, Russia

†Britton Chance Center for Biomedical Photonics
Wuhan National Laboratory for Optoelectronics
Huazhong University of Science and Technology
Wuhan 430074, P. R. China

‡MoE Key Laboratory for Biomedical Photonics
School of Engineering Sciences

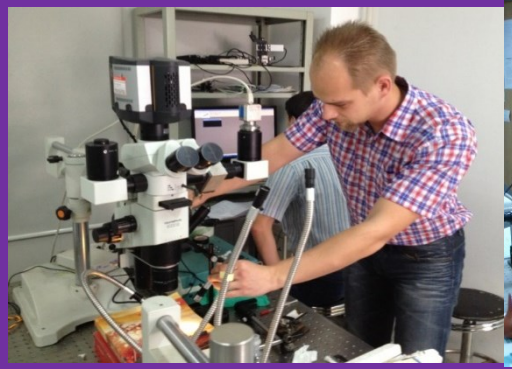






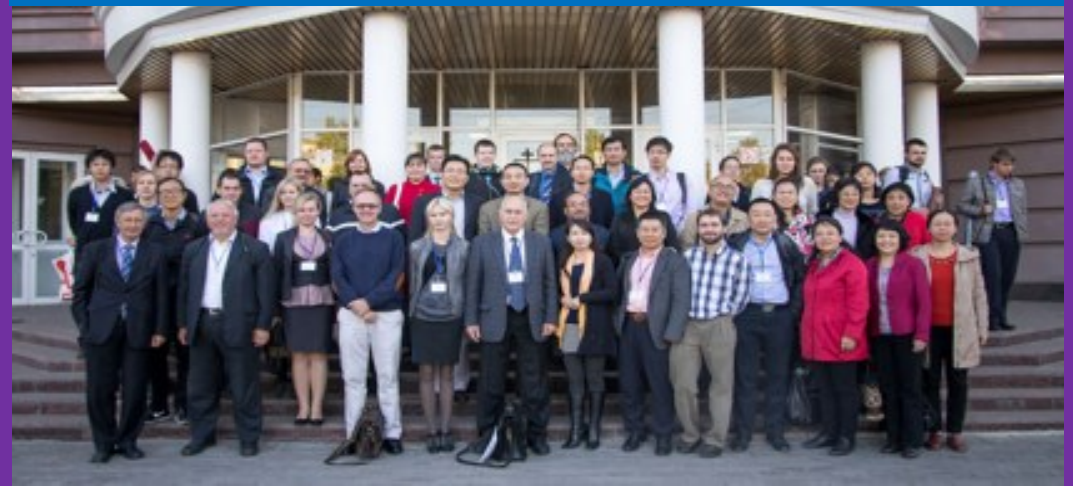
Chinese-Russian Workshop on
Biophotonics and Biomedical Optics-2021
December 3-4, 2021

Visitors Wuhan - Saratov

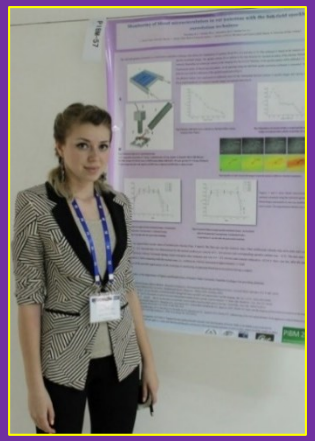


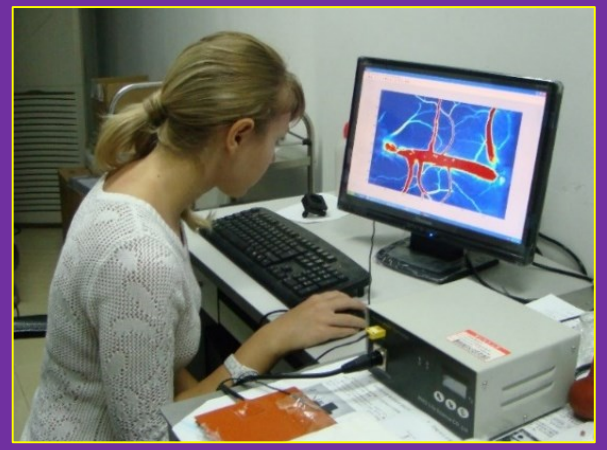
Russian-Chinese Workshop on Biophotonics and Biomedical Optics

Saratov, Russia, Sept. 26-29, 2012

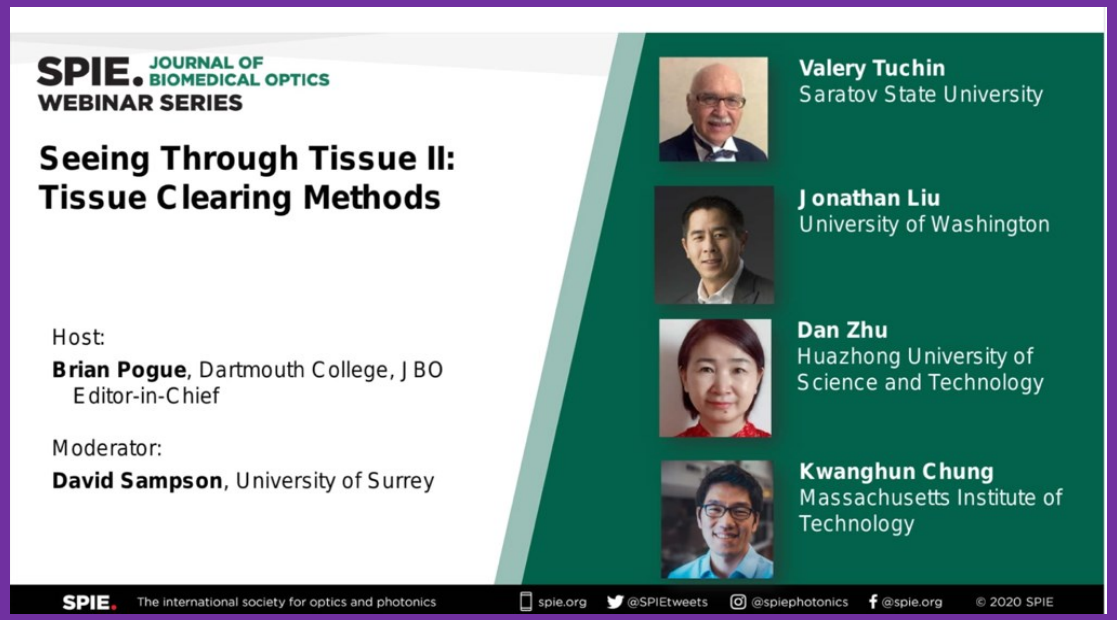


Visitors Wuhan - Saratov



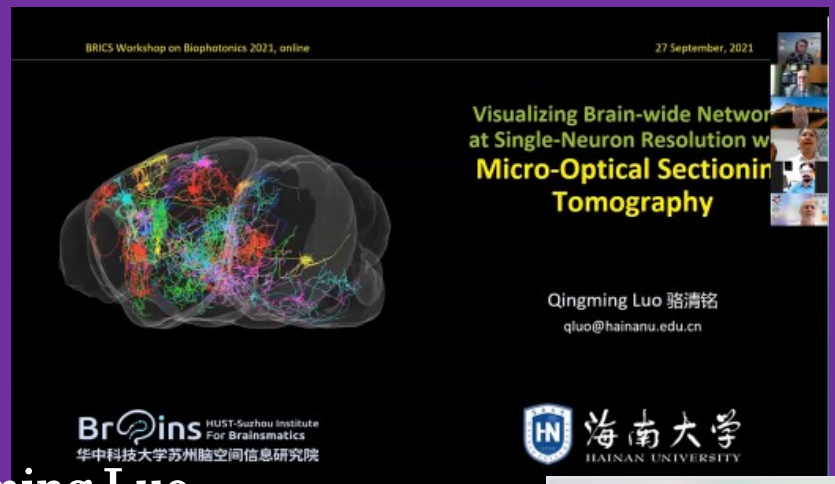


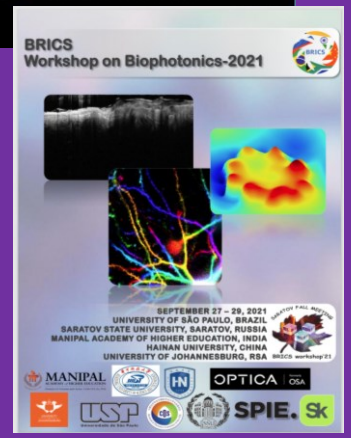
We are working hard to train new generations of researchers in the field of biophotonics in Hubei province, Saratov region and around the world



POEM Wuhan International Meeting: Young Researcher Awards Ceremony

Academician Qingming Luo



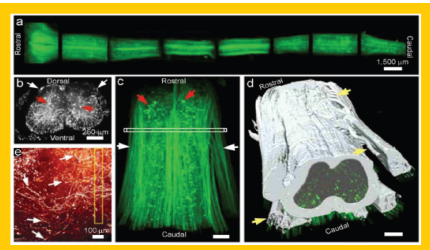


Books, reviews, special issues of journals

Laser Photonics Rev., 1–26 (2013) / DOI 10.1002/lpor.201200056

LASER & PHOTONICS REVIEWS

Abstract Tissue optical clearing technique provides a prospective solution for the application of advanced optical methods in life sciences. This paper gives a review of recent developments in tissue optical clearing techniques. The physical, molecular and physiological mechanisms of tissue optical clearing are overviewed and discussed. Various methods for enhancing penetration of optical-clearing agents into tissue, such as physical methods, chemical-penetration enhancers and combination of physical and chemical methods are introduced. Combining the tissue optical clearing technique with advanced microscopy image or labeling technique, applications for 3D microstructure of whole tissues such as brain and central nervous system with unprecedented resolution are demonstrated. Moreover, the difference in diffusion and/or clearing ability of selected agents in healthy versus pathological tissues can provide a highly sensitive indicator of the tissue health/pathology condition. Finally, recent advances in optical clearing of soft or hard tissue for in vivo imaging and phototherapy are introduced.



REVIEW ARTICLE

Recent progress in tissue optical clearing

2013

Dan Zhu[1,2,*], Kirill V. Larin[3,4], Qingming Luo[1,2], and Valery V. Tuchin[4,5,6,*]

Journal of Biomedical Optics

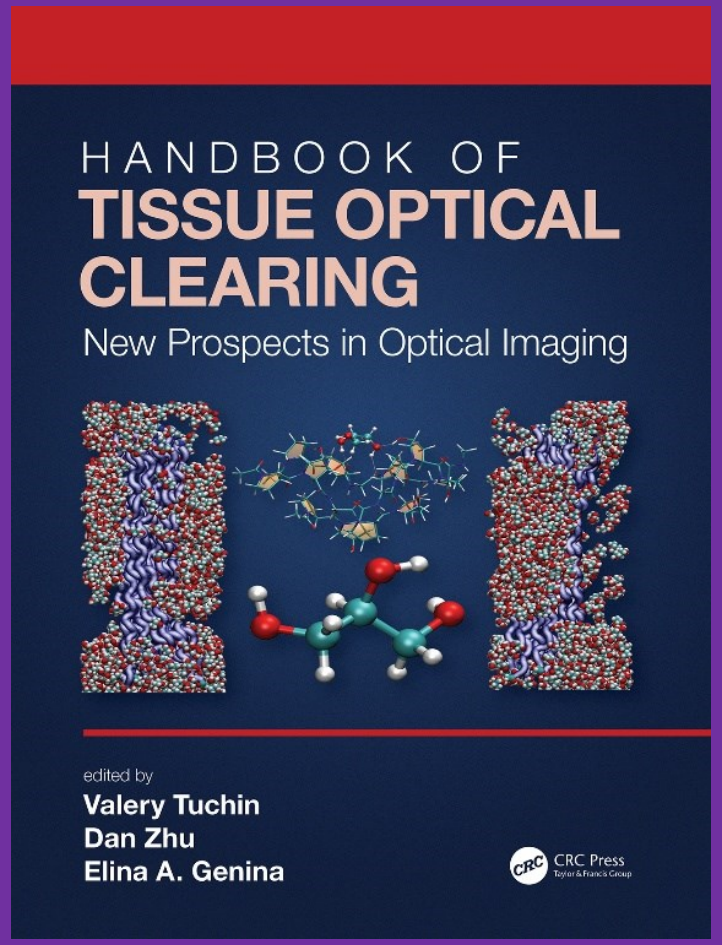
BiomedicalOptics.SPIEDigitalLibrary.org

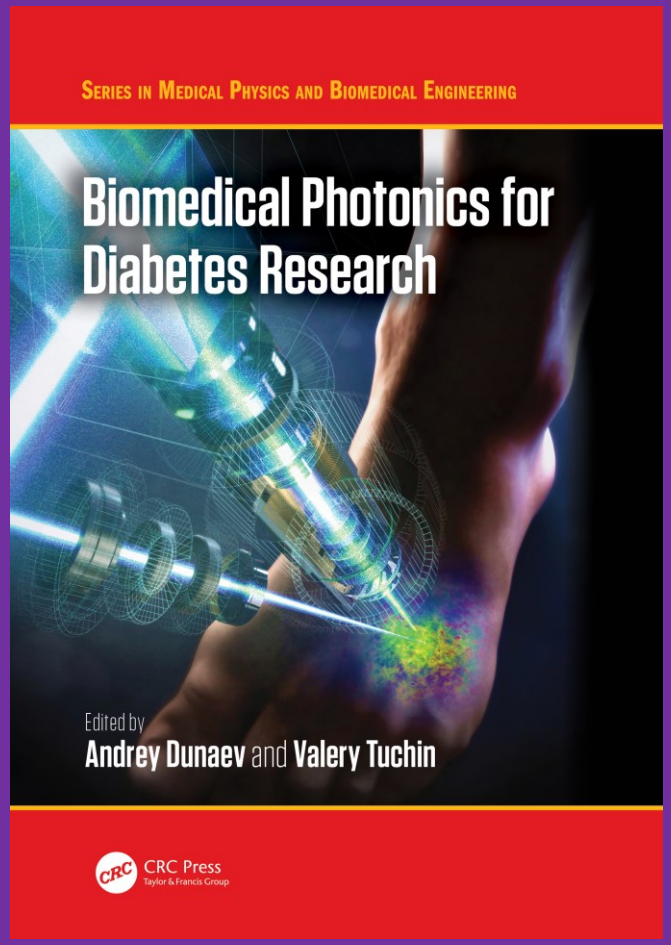
Tissue and Blood Optical Clearing for Biomedical Applications

Dan Zhu
Bernard Choi
Elina Genina
Valery V. Tuchin

2016

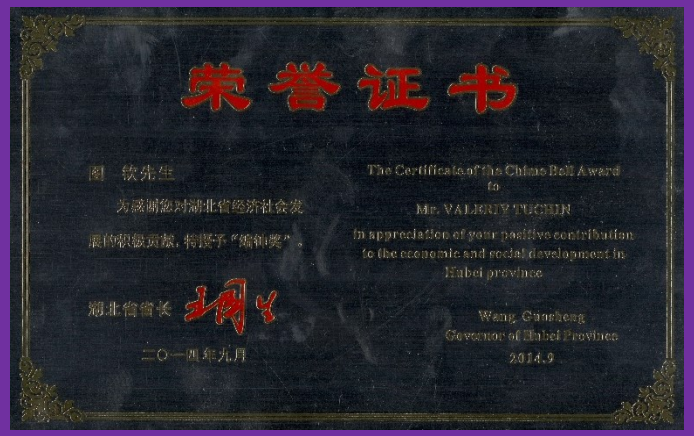
2022





37 Chapters

Huazhong University of Science and Technology


荣誉证书

The Certificate of the Chime Bell Award to Mr. VALERIY TUCHIN in appreciation of your positive contribution to the economic and social development in Hubei province

Wang Guocheng
Governor of Hubei Province
2014.9

LETTER OF APPOINTMENT

Mr. Valery Tuchin

You are hereby appointed to be Advisory Board Member of School of Engineering Sciences, from June 2014 to May 2019.

School of Engineering Sciences
Wuhan National Laboratory for Optoelectronics
Huazhong University of Science and Technology

ISSUE DATE:12/6/2014

聘　书

兹聘请 Valery Tuchin（瓦列尼·图钦）教授为华中科技大学工程科学学院咨询委员会委员。聘期 2014 年 6 月至 2019 年 5 月。

华中科技大学工程科学学院
武汉光电国家实验室
二〇一四年六月十二日

Chime Bell Prize of Hubei Province, China (**2014**), in appreciation of the positive contribution to the economic and social development in Hubei Province

We Love Chinese Culture