

Infochemistry Program

the Interdisciplinary Future *in the Heart of*
Saint Petersburg

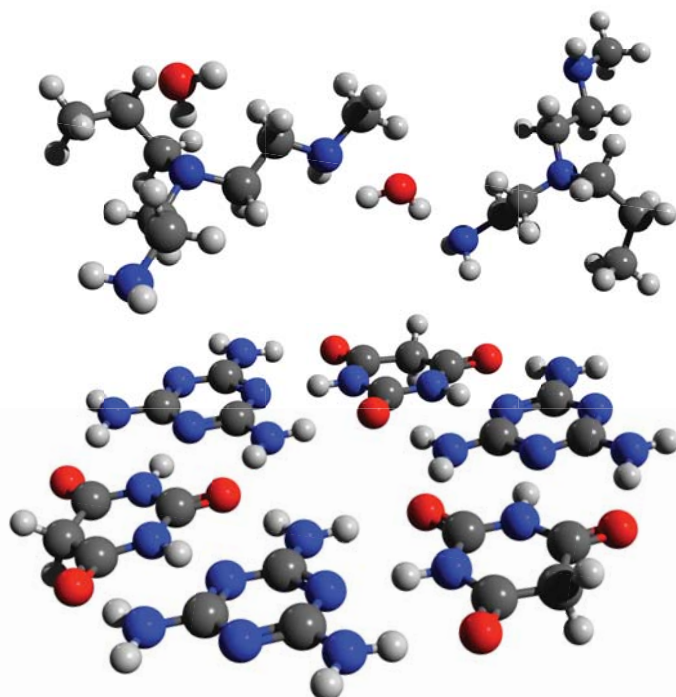


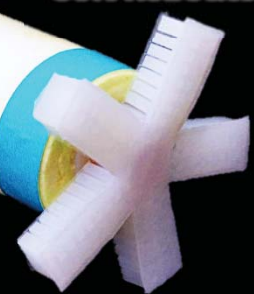
NOW YOU CAN!

Infochemistry Scientific Center (ISC) of ITMO University
invites you to apply now for entering
Infochemistry Master Program in English

Research areas:

- ✓ **Synthetic Cell**
- ✓ **Chemical Computer**
- ✓ **Origin of Life Chemistry**
- ✓ **Nonlinear Chemical Systems**
- ✓ **Theory of Solubility**
- ✓ **Adaptive Materials**
- ✓ **Diagnostic for Life (D4L)**
- ✓ **Robotization of Chemistry**
- ✓ **Digitalization of Chemistry**





Do you want to study
at Russia's «**First Non-Classical**»
ITMO University?

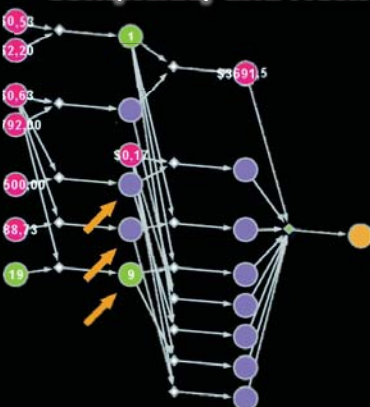
Robotization of
chemical
technology



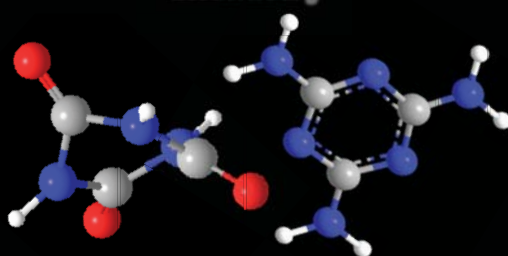
Why Infochemistry?

- ✓ Education based on research
- ✓ Interdisciplinary approach
- ✓ Studies in English
- ✓ Individual educational courses and module educational system
- ✓ Opportunity to attract the partner & Start Up
- ✓ Supervisors are researchers with international experience
- ✓ Free access to hi-tech equipment and research facilities
- ✓ Papers in high-impact journals
- ✓ Scientific internships at partner universities around the world

Complexity and Networks



Chemistry



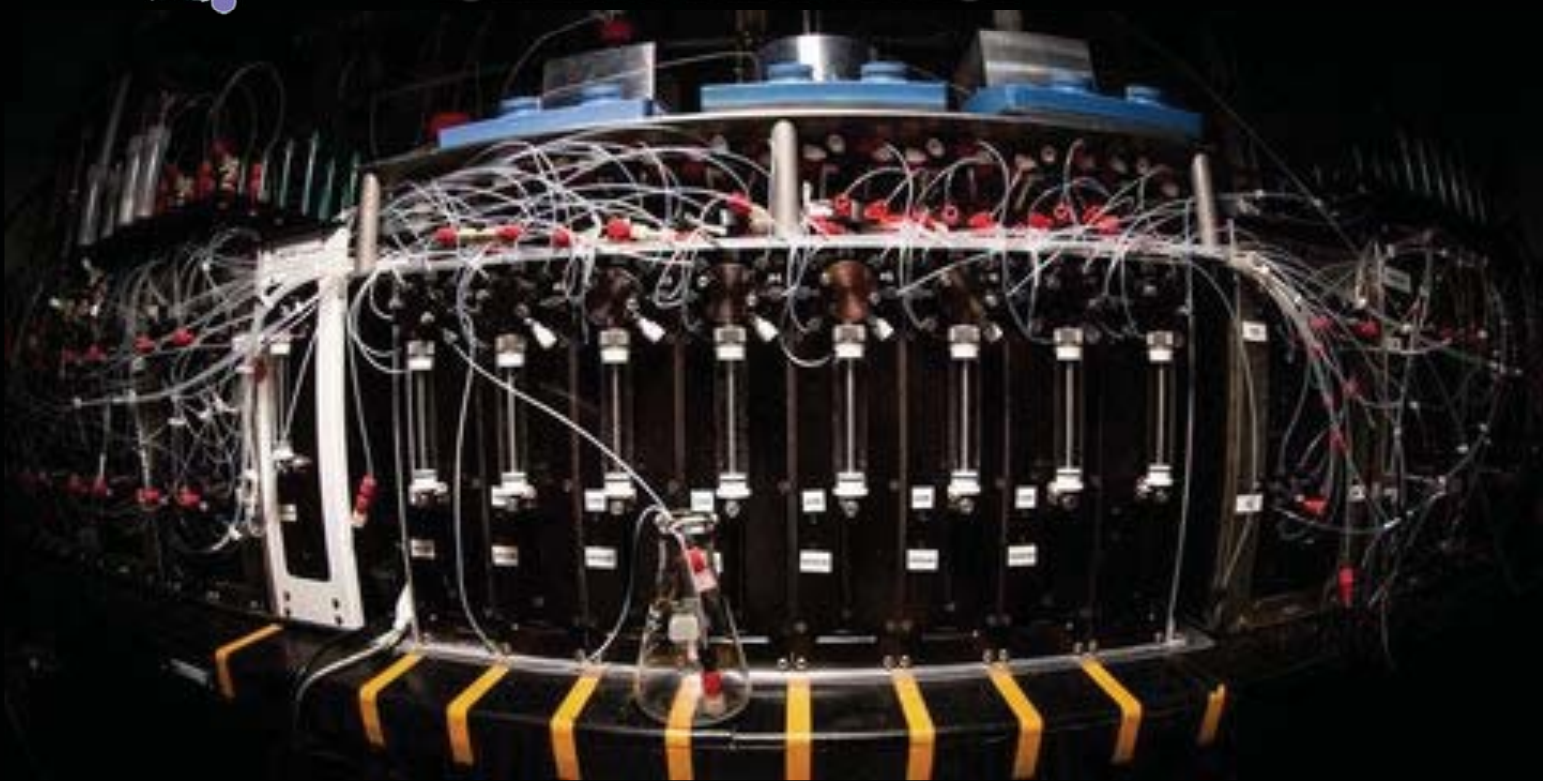
Algorithms

1110000011100

Digitalization of Chemical Technologies

IT and Mathematics

$$\begin{aligned}
 & \frac{A \setminus B}{B \setminus A} \quad S_n = a_1 \frac{q^n - 1}{q - 1} \quad V(k, n) = \frac{n!}{(n-k)!} \quad P(A|B) = \frac{P(A) \cdot P(B)}{P(A) \cdot P(B)} \quad \log_a r \cdot s = \log_a r + \log_a s \\
 & z^n = |z|^n (\cos n\varphi + i \sin n\varphi) \quad \bar{z} = \sqrt{z_1 \cdot z_2 \cdots z_n} \quad \log_a \sqrt[n]{r} = \frac{1}{n} \log_a r \\
 & Z = a + bi \quad y = \sin x \quad y = \cos x \quad x_{1,2} = \frac{-b \pm \sqrt{D}}{2a} \quad \vec{a} \cdot \vec{b} = |\vec{a}| |\vec{b}| \cos \alpha \\
 & (a+b)^n = \binom{n}{0} a^n b^0 + \binom{n}{1} a^{n-1} b^1 + \binom{n}{2} a^{n-2} b^2 + \dots + \binom{n}{n-1} a^1 b^{n-1} + \binom{n}{n} a^0 b^n
 \end{aligned}$$



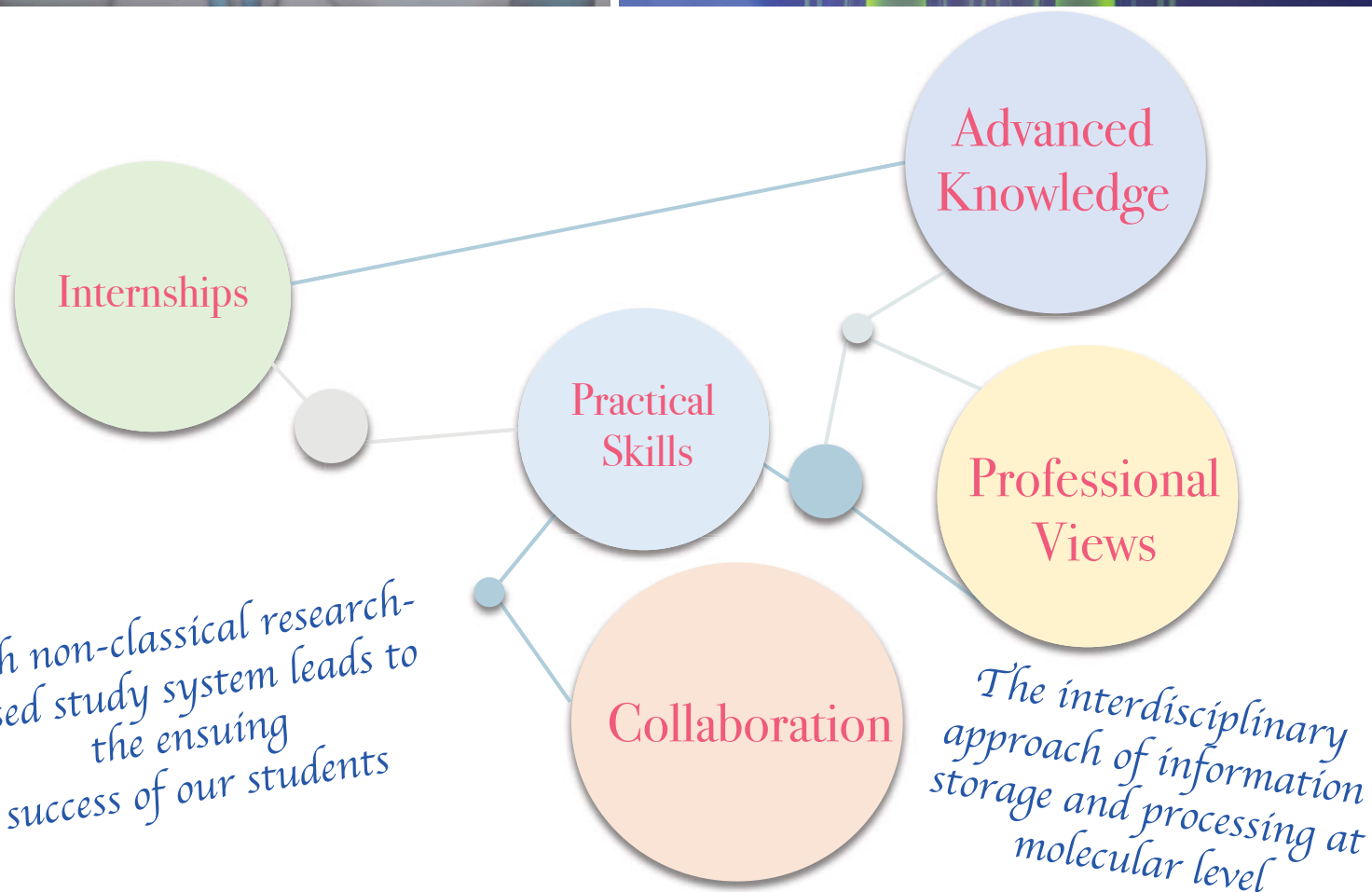
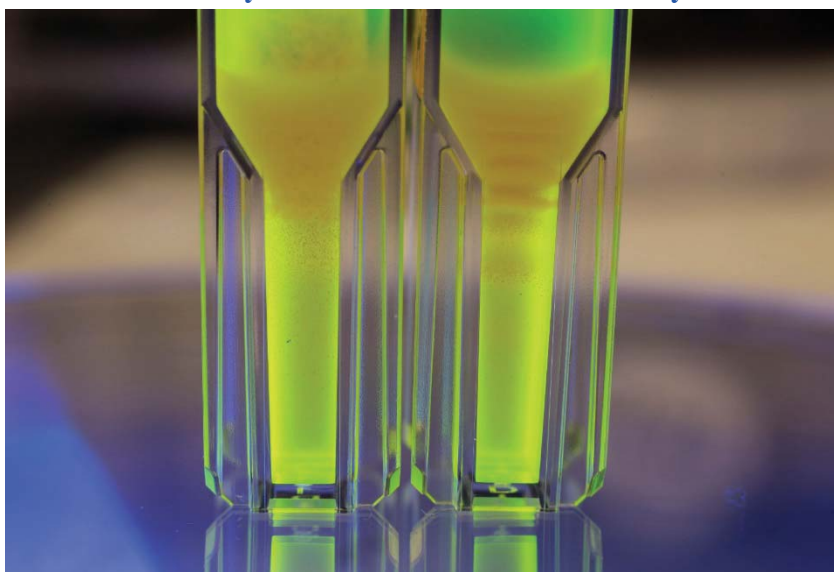
About Infochemistry Master Program

The Infochemistry Master's program is aimed at training highly qualified specialists with an interdisciplinary understanding of complex systems in chemistry and biology, their experimental research, modeling and prediction, as well as those capable of solving the tasks of personalized medicine and nutrition at a new level of Big Data analysis and understanding analogies and Synergetics.

Specialization

✓ Digitalization of chemical technology

✓ Basics of molecular organized systems and Infochemistry



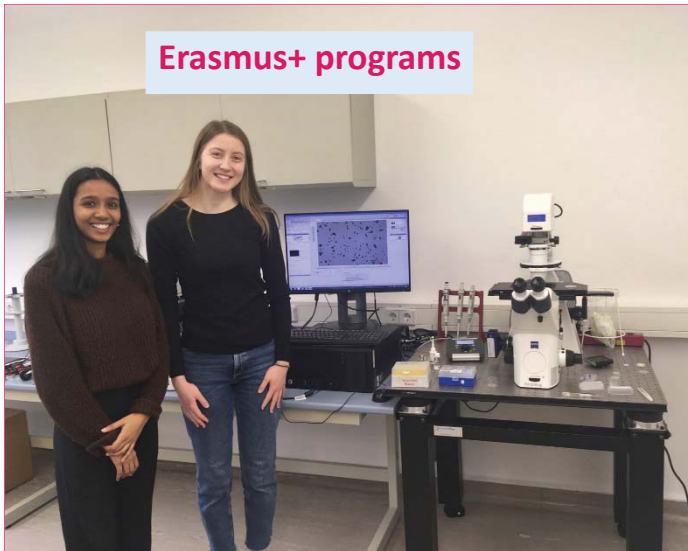
Support for Talented Young Scientists and Students

Master's students participate in various competitions and receive **Awards and Scholarships:**

- ✓ Increased State Academic Scholarship
- ✓ Research grants ("UMNIK", practice-oriented research at ITMO University, etc.)
- ✓ Vladimir Potanin scholarship
- ✓ Grants and scholarships of the Government of St. Petersburg
- ✓ Russian Presidential Scholarship
- ✓ Scholarships for study or internships abroad (Erasmus+, etc.)
- ✓ Grants of KNVSH

and many, many others...

Erasmus+ programs



Start-up villages



Prices and scholarships



Potanin's Scholarship



Potanin's Scholarship



"UMNIK" grant



Internships



Development at ISC ITMO University

Collaboration with Leading Research Teams

A **joint laboratory** of “Robotization and digitalization of materials science” is opened with Prof. Daria Andreeva-Bacumler and Prof. **Konstantin Novoselov** (Nobel Prize in Physics).

Scientific articles are published in **High Impact Journals** with TOP Scientists, e.g. Prof. **George Whitesides** (Highest Hirsch index rating of all living chemists).

Prof. Jean-Marie Lehn (Nobel Prize in Chemistry) provides any help and supports the development of such an interesting and new field of chemistry as Infochemistry.
He is a **Scientific Advisor of ISC ITMO University**.

A **joint laboratory** between Active Materials and Interfaces Laboratory of University of Liverpool (Prof. Dmitry Shchukin), United Kingdom and ISC ITMO University (Prof. Ekaterina Skorb), Russia

“Robotization and digitalization of materials science” meeting of Scientists from NUS (Singapore) and ITMO (Russia)



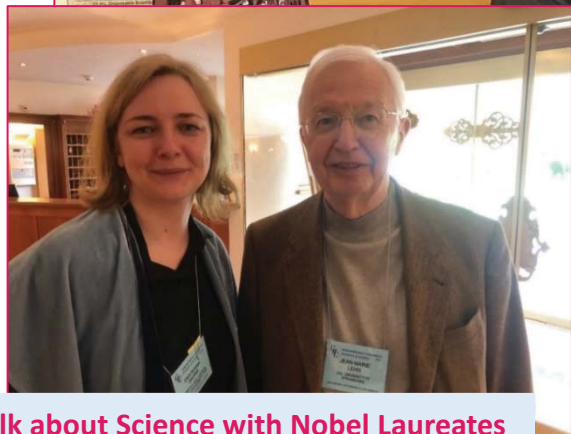
Discussion with Prof. Whitesides at Harvard University



Talk about Science with World Leaders



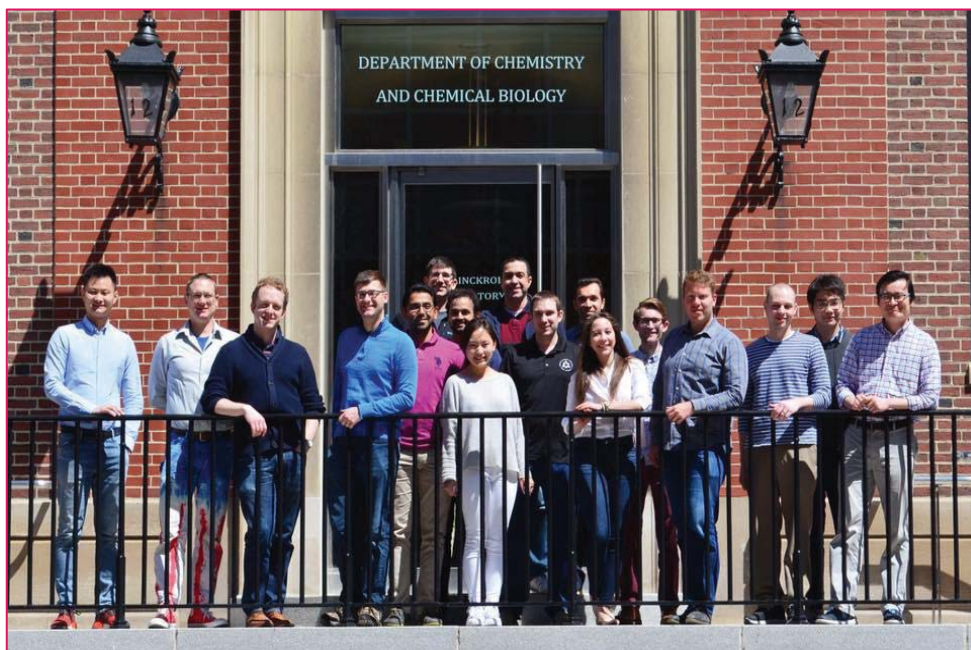
Talk about Science with Nobel Laureates



Talk about Science with Business Leaders

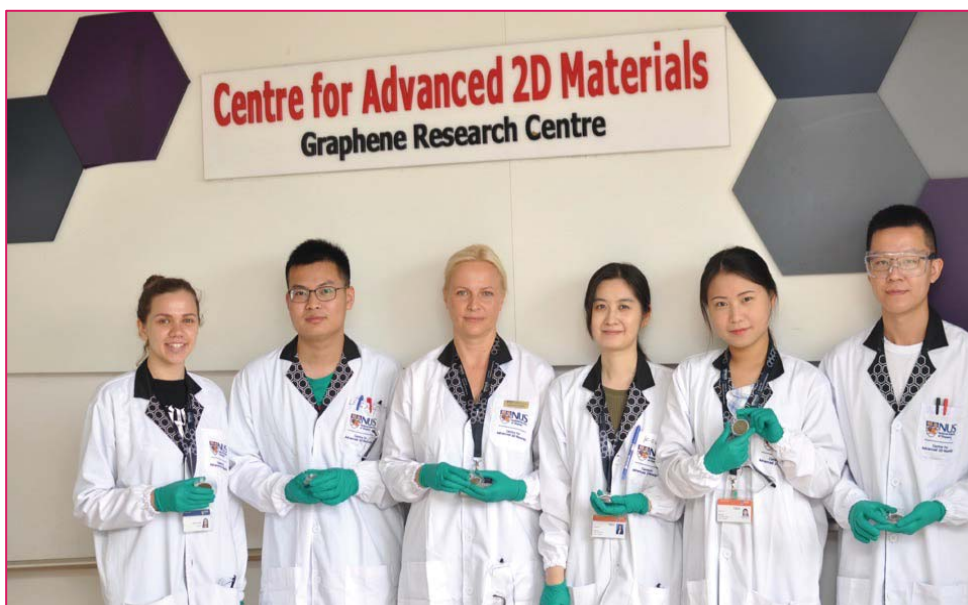


Scientific internship at University in Europe, USA, UK, Singapore, Israel –
is a great opportunity to improve research skills and knowledge

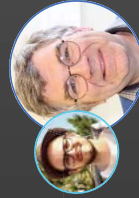


Symon Koltsov went to **Harvard University** for an internship in the 1st year of his master's degree and published a joint article with Prof. **George M. Whitesides**.

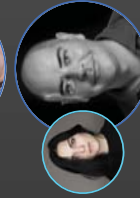
Anna Nikitina went to the **National University of Singapore** for an internship in the 2nd year of her master's degree and prepare a joint article with the **Nobel Laureate**.



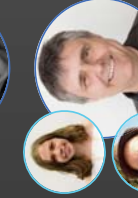
International workshop in the **UK (University of Liverpool)** to build professional links with partner University and gain new skills and knowledge



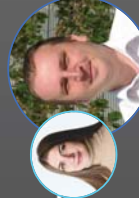
Pierre Schaaf
H-index 78
Université de Strasbourg



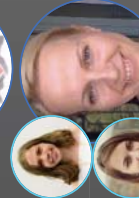
Alvarez Puebla Ramon
H-index 61
Universitat Rovira i Virgili



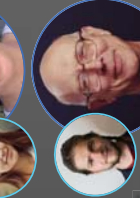
Peter Fratzl
H-index 107
Max Planck Institute



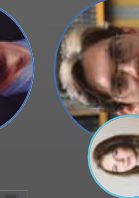
Dmitry Shchukin
H-index 55
University of Liverpool



Daria Andreeva-Bacumler
H-index 27
National University of Singapore



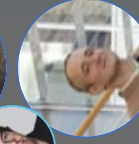
George M. Whitesides
H-index 220
Harvard University



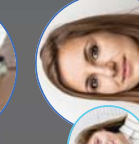
Sergey Semenov
H-index 16
Weizmann Institute of Science



Jean-François Dufrêche
H-index 25
Institut de Chimie Séparative de Marcoule



Bertrand Siboulet
Institut de Chimie Séparative de Marcoule



Julianne Slmmchen
H-index 16
Technical University of Dresden



Andre Skirtach
H-index 53
Ghent University



Nikolai Gaponik
H-index 63
Technical University of Dresden



Singapore

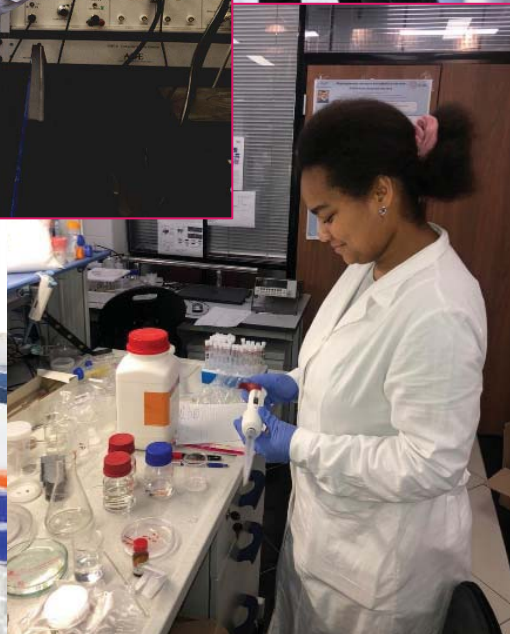
What are we doing?

Our scientific life

Daily development and hard-working:

- ✓ Working in laboratories on projects
- ✓ Writing scientific articles
- ✓ Collaboration with the Scientific World, the World of Design, Industrial enterprises, the Media industry
- ✓ Working with other departments and institutes under Interdisciplinary projects and tasks
- ✓ Organization and Participation in the meeting, workshops, and conferences

This is all our Infochemistry Scientific Center of ITMO University



Master's students work on their **own research** or industrial projects in one of the **research groups** of the ISC ITMO University and have free access to **hi-tech equipment**

Research groups



Infochemistry Group

- Development of synthetic cell
- Chemical computer
- High-energy chemistry and self-organization



Chemometrics Group

- Electrochemical sensors
- Big data processing of multisensory systems
- Machine learning



Computational Chemistry Group

- Thermodynamic calculation of intermolecular interactions
- Computational chemistry of macromolecules
- Quantum chemical calculations of complex systems
- Solubility theory



Digitalization of Food technologies Group

- Personalized nutrition
- Food Industry Trends
- Functional food



Biomimetic materials Group

- New materials for regenerative medicine
- Photochemical modification of materials
- Capsules in medicine and biochemistry
- Metals nanostructuring



Bioelementology Group

- New integrative direction of life Sciences
- Assessment of the elemental status of a person
- Personalized correction of metabolic diseases



IT and Engineering Group

- Digital transformation in chemistry
- Digital chemical detection devices
- Information theory

The joint Laboratories



NUS
National University
of Singapore



UNIVERSITY OF
LIVERPOOL

Content of the program

Professors ,
Lecturer, TOP-
scientists with
international
experience

Main disciplines

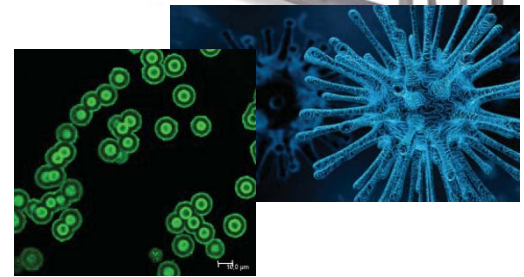
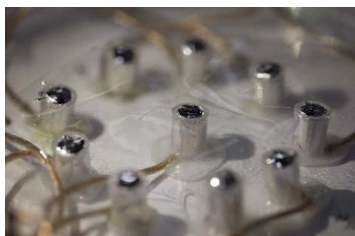
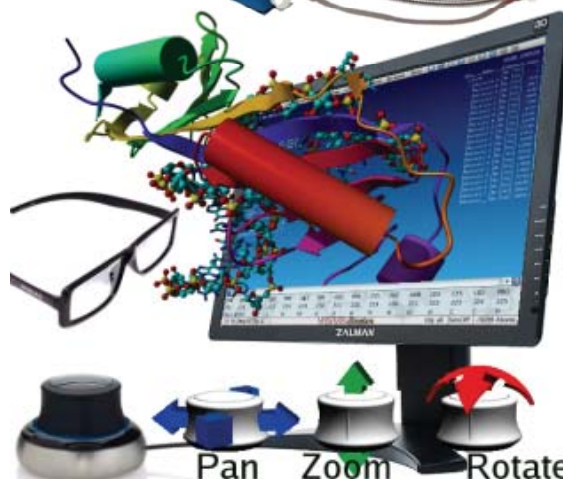
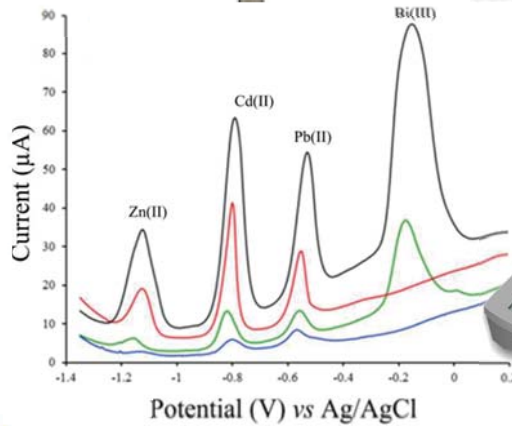
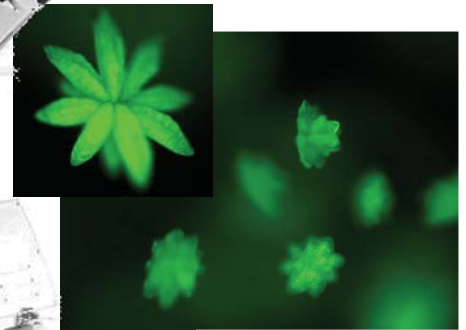
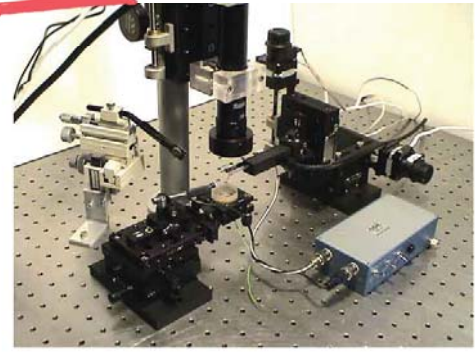
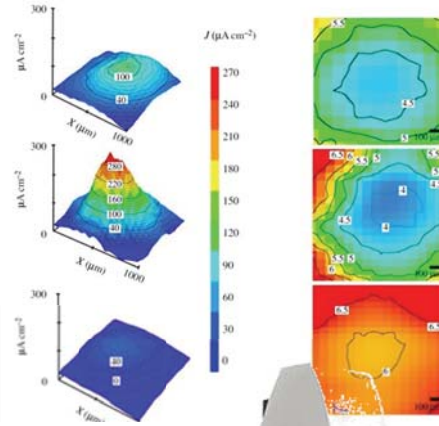
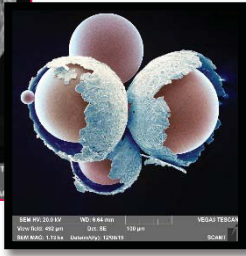
Scientific English;
Data Processing and Analysis;
Infochemistry;
Topical areas of colloid chemistry;
Molecular organized systems;
System chemistry;
Analytical chemistry;

Selected chapters of physical chemistry and electrochemistry;
Information theory and self-organization

Mathematics of the nonlinear chemical systems;
Non-linear chemical systems & chemical;
Percolation theory; chemistry;
Robotization of

Synchronization of chemical and biological
oscillators;
Multimodal sensor systems;
DNA nanomachines for biomedical applications;
Autocatalysis and oscillating reactions.

High-tech equipment and the results



How to join to Infochemistry educational program in the ITMO University?

Steps to become a Master of ITMO University

1. Learn more about the Infochemistry educational program on the official website of the ITMO University:

(Russian
and
English,
versions)

<https://abit.itmo.ru/program/13372/>

or

<https://en.itmo.ru/en/viewjep/2/80/Infochemistry.htm>

and the website of the ISC ITMO University

<https://infochemistry.ru/>

2. Register on the website to apply for entry to the ITMO master's program in your account.

Choose an Infochemistry Educational program

3. In your account, you can choose the following ways to entry to ITMO University:

- ✓ Competition of reports within the framework of the Congress of Young Scientists

<https://kmu.itmo.ru/static/scientists/32/1>

- ✓ Portfolio Competition
- ✓ Online entrance examination
- ✓ Classic entrance examination

More details about entrance examinations <https://abit.itmo.ru/page/84/>

4. Need to submit all the necessary documents to the Admissions office of ITMO University

(Russia, 197101, St. Petersburg
Kronverkskiy pr., 49, lit. A)

We recommend You to complete a Research Internship at the ISC (participants receive a recommendation letter that gives an additional points for entrance).

We do recommend You to write us a letter (skorb@itmo.ru) before submitting your application form in the ITMO personal account for more detailed instructions.

Career options

The program's graduates can work in different fields such as petrochemical and biotechnology units; chemical, chemical-technological, and nanoengineering enterprises; major pharmaceutical companies and holdings.



Master's students may implement their academic career by enrolling in leading Ph.D. programs in chemistry and biotechnology.

Our graduates will be in high demand at leading scientific institutions both in Russia and abroad.



Any questions you can to write skorb@itmo.ru or

Mob +7 (999) 210-39-77

Prof. Dr. Ekaterina V. Skorb – Director of Infochemistry Scientific Center