Expertise, projects and plans

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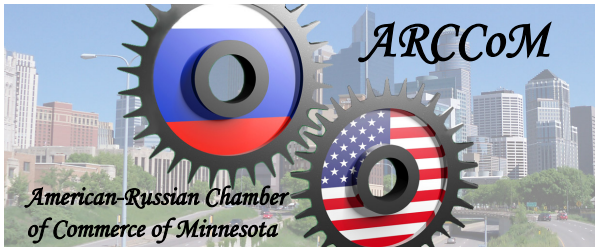
Nano & Giga

RuSTEC



- **Education, science and technology**
- **Research and management**
- **Past and current projects**
- **Experience and expertise**

Brief professional history

- **MS from Mendeleev University of Chemical Technology of Russia**
- **PhD from Lomonosov Moscow State University**
- **10 years researcher in Soviet Union Academy of Science**
- **4 years research in Germany: University of Erlangen-Nurnberg and Max-Planck Institute in Muelheim-an-der-Ruhr**
- **2 years research at the University of Florida**
- **6 years R & D at Motorola, Phoenix, Arizona**
- **9 years at Arizona State University**
- **Short research visits at Dalhousie University, Canada, Tyndall Institute, Ireland, and University of Tokyo, Japan**
- **13 years of consulting experience**

Research areas

Modeling reaction centers of photosynthetic bacteria
PhD work at Moscow State University

Computational studies of structures and properties of the compounds 1st and 2nd rows
Russian Academy of sciences and Nurnberg University, Germany

Computational studies of biologically active oligopyrroles – models of phytochrome
Max-Planck Institute, Germany

Computational design of advanced propellants and explosives
University of Florida, USA, Dalhousie University, Canada

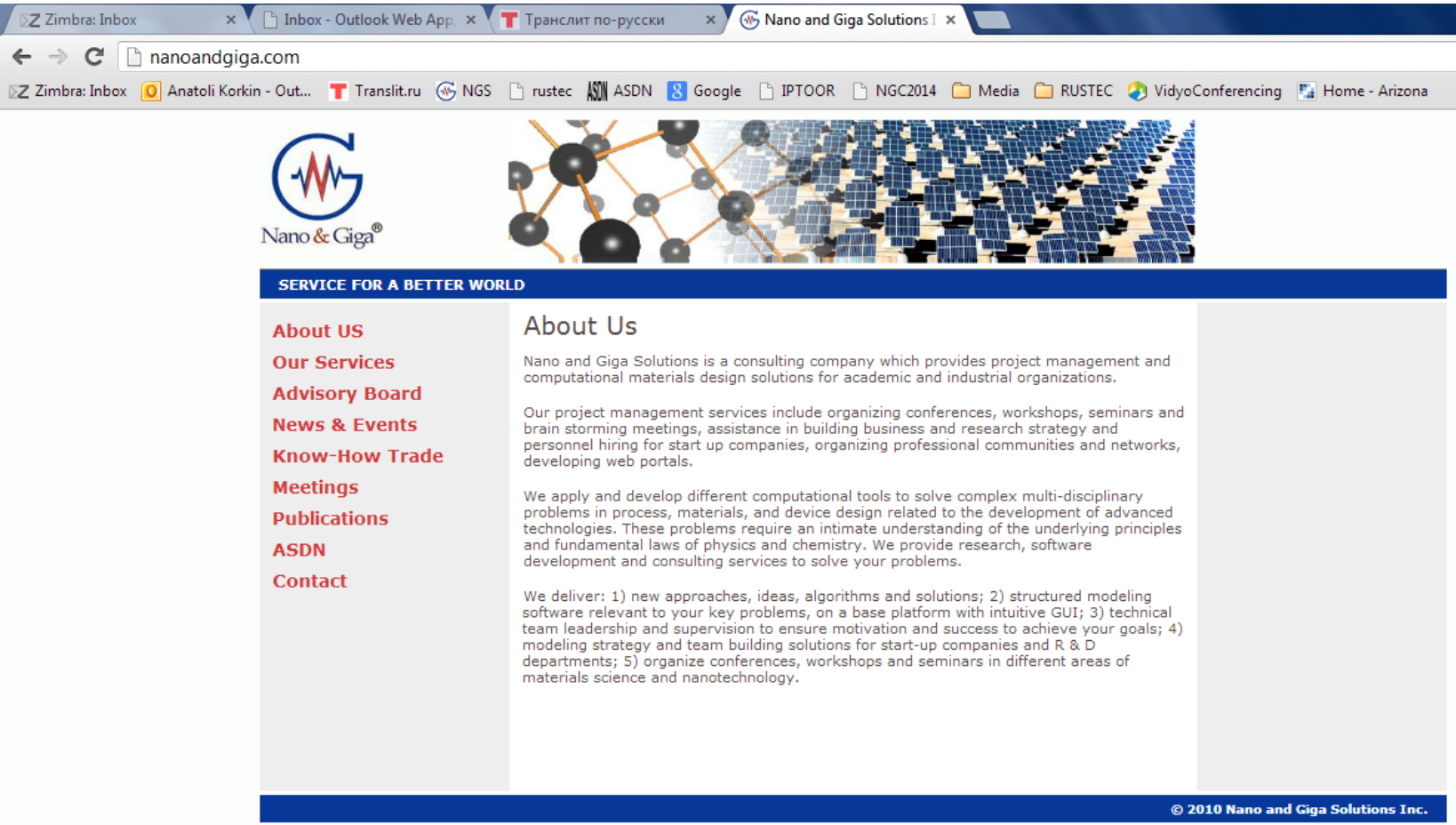
Computational design of electronic materials and devices
Motorola, USA, University of Tokyo, Japan,Tyndall Institute, Ireland

Funding for past research and education projects

- HEDM – University of Florida : AFOSR, NAVY ~$3M
- Chemical kinetics – SoftTec: Motorola ~ $250k
- KHIMERA - Kintech : Motorola, DOE, EU ~ $1M
- SAGEMD– Sarov: DOE ~ $250k
- HIKE – Moto, Infineon, NMRC, UCL, LAAS: EU EURO 3M
- NGC conferences – various sponsors ~$700k
- Si-SiO_2 Interface – Sematech, UF, NMRC – NSF, EU, Sematech ~$0.5M
- $ZrSiO_4$ - University of Tokyo – Japanise government ~$400k
- Training workshops and schools $500k
- Atomic Scale Design Ntework $200k

In 2003 I have started consulting company "Nano and Giga Solutions“

http://www.nanoandgiga.com



Nano & Giga Solutions Portfolio

General overview

- Contracts (subcontracts) for ongoing R & D projects in computational material science and nanotechnology
- Assistance with proposal development for future funding
- Consulting in evaluation of proposals and technical solutions
- Team building for complex remotely managed technical projects
- Assistance in hiring technical personnel and evaluation of candidates on pilot, short term contracts
- Organizing technical workshops and brain storming meetings with leading external experts
- Editorial, publishing and web development

Conferences & Publishing

Conference package & remote management

- Conference website with data bases, forms and connection to the merchant account
- Internet based editorial office with the hierarchical structure, data bases and multi-layer information protection
- Professional network of reviewers, speakers, exhibitors and sponsors
- Expertise in training, international scientific event management
- Connections to and expertise in working with leading publishers
- Publishing books and special issues of international journals

Nano & Giga Forums: Brief History

- **NGCM2002:** School at MSU, Symposium at Central House of Scientists, Organizers – Motorola, MSU (Phys. Dept.), Kurchatov Institute, satellite meeting in computational materials science held at hotel Rossia.
- **NGCM2004:** Krakow, Poland, held at Jagiellonian University, Business partner – FQS Poland (Fujitsu group)
- **NGC2007:** Phoenix, Arizona, held at Arizona State University, business section was introduced and photonics spelled out in the title. Two Nobel laureates and governor Jannet Napolitano were speakers
- **NGC2009:** Hamilton, Ontario, Canada, held at McMaster University, joint meeting with 14th Canadian Semiconductor Technology Conference (CSTC2009), discovery oral sessions have been introduced and renewable energy added to the title.
- **NGC2011:** Was held in Russia in partnership with NT-MDT and Moscow State University.
- **NGC2014:** Another forum in Arizona held in conjunction with RuSciTech forum of Russian-speaking scientists abroad. Over 150 personally invited speakers.

Nano & Giga Forums: Traditions

- Medium size truly interdisciplinary conference: 200-500 participants
- Truly international – more than 30 countries represented, all committees are international
- Large presence of world class scientists, technology and business leaders and young talents, students, postdocs and researchers
- Truly democratic with highly networking atmosphere - everyone feels equally involved – active poster sessions, rich social program
- Combination of education, scientific expertise exchange and technical due diligence
- Excellent publication record – 1-2 special journal issues and tutorial book. Only peer reviewed selected papers have been accepted
- Efficient business model – a lot of exposure for host institution and training in event management for local organizers

Nano and Giga Challenges in Electronics, Photonics and Renewable Energy

Current Trends in Radio Physics

Symposium and Summer School (Tutorial Lectures)

Tomsk, Russia, September 18-22, 2017

nanoandgiga.com/ngc2017 and conference.tsu.ru/apr

Oral Sessions | Poster Presentations | Publications | Networking | Awards | Contacts

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Conference overview

Energy and information are essential elements for the development of human society which are interconnected. Transmission, processing and storage of information requires energy consumption, while the efficient use and access to new energy sources requires new information (ideas and expertise) and the design of novel systems such as photovoltaic devices, fuel cells and batteries. Semiconductor physics creates the knowledge base for the development of information (computers, cell phones, etc.) and energy (photovoltaics) technologies. The exchange of ideas and expertise between these two technologies is critical and expands beyond semiconductors.

Efficient use of solar energy requires development of novel energy storage devices while biosystems provide new paradigms for the development of materials and devices for information (processing and storage) and energy (e.g. biofuel and artificial photosynthesis) technologies and biomedical applications (sensors and dignostics). Energy transmission through the space requires advances in lasers, antennas, wave guides and other photonic devices. Progress in information and renewable energy technologies requires miniaturization of devices and reduction of costs, energy and material consumption. Nanotechnology is widely accepted as a source of potential solutions in securing future progress for information and energy technologies.

The NGC2017 & CTRP2017 conference in Tomsk, Russia is an interdisciplinary forum in education, research and technology innovations in

Educational web portal – ASDN.NET
Atomic and nano scale science tutorials
Recently rebranded as a computational materials and Device design center sponsored by Tomsk State University
http://www.asdn.net

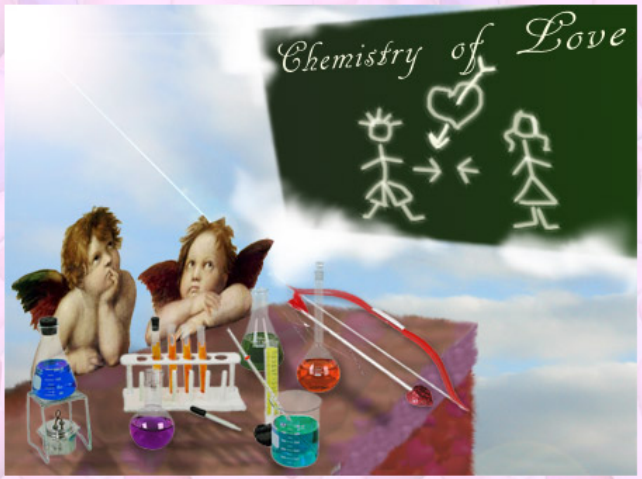
Atomic Scale Design Network: Brief history

- Initial idea – internet networking support of Motorola R & D projects in materials, process and device design (1999)
- First partner and prototype made by – Jan Labanowski, owner of Computational Chemistry List, one of the oldest internet communities
- New concept – educational web portal in atomic scale materials design, fundamentals of nanotechnology (2005). Combination of Wikipedia -like (accurate content) and MySpace-like (personalized presentation – original page design)
- Business model and partner – paid advertisement for companies and free advertisement for scientists and students, marketing support for leading Russian company in nanotech equipment - NT-MDT
- Educational, research and innovations web portal in computational materials and device design in support of the center and network sponsored by Tomsk State University (2014)

Chemistry of Love-
The most popular page at ASDN.NET
http://www.asdn.net/asdn/chemistry/chemistry_of_love.shtml

Electronics
Life
Nano4kids
Nanotools
Announcements
Links
Contributors
E-mail us

Chemistry Of Love



Attraction, love and relationships are fueled by actual chemicals, well, who hasn't heard that line nowadays? So many different hypothesizes of the processes of falling in love and out of it were recently proposed and so many different candidates of chemicals named to be blamed that the subject gets more and more complicated. Let's try to pull all of them together and get a clear picture for to date, because with the modern level of science may be as soon as tomorrow another interesting piece of puzzle of the matter will be discovered.

First let's define what we are talking about, the term "chemicals" are by far too broad. Chemicals responsible for our behavior in love and relationships belong to the class of "neurochemicals", compounds forming largely in the brain and participating in neural activity. The brain, in its turn, passes them to other parts of the body, but "in the head" it all gets started.

First attraction, first "sparks" in the air followed by falling in love are caused by combination of three neurochemicals: phenylethylamine, norepinephrine and dopamine. Later stages of long relationships are guiding by another two: oxytocin and serotonin. That's our five candidates for today. Lets take a more close look on the first three:

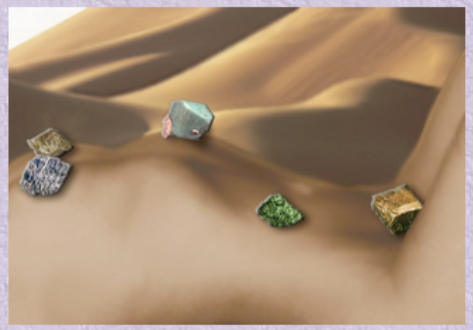
1. **Norepinephrine**, as is clear from its other name **Noradrenaline**, stimulates the production of adrenaline, which makes our heart race, and the palms sweat. Norepinephrine is getting released from neurons, or, simply, nerve cells in the brain, which are called noradrenergic neurons, of course.
   The noradrenergic neurons in the brain form a sort of system, which is, in its turn, called norepinephrine system, that, when activated, exerts effects on large areas of the brain [1]. By this action we can call it a neurotransmitter system, because its main function is the transmission of nerve impulse, which causes the other nerve to fire and pass the message along the "chain". The noradrenaline system consists of just 1500

Chemistry of Silicates –
On first page of Google search for silicates

http://www.asdn.net//asdn/chemistry/silicates.shtml

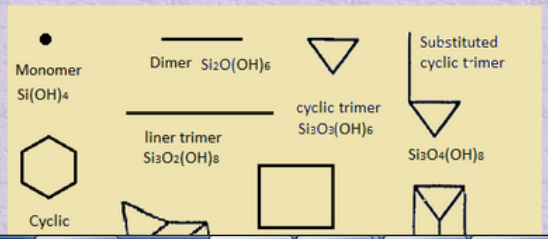
dimensional framework together. In the case of feldspars Si^{4+} cation is replaced by Al^{3+} in tetrahedra providing negative charge of this anionic framework. This negative charge is balanced by cations e.g. Na^+ in Albite ($NaAlSi_3O_8$), K^+ in Microcline ($KAlSi_3O_8$) and Ca^{2+} in Anorthite ($CaAl_2Si_2O_8$). Zeolites can also be attributed to tectosilicates [1].

Non-crystalline natural silicates



Natural amorphous silica such as Diatomite and precious opal (natural hydrated amorphous silica) are examples of this type of non-crystalline silicates. They are amorphous in the sense that they does not give a sharp X-ray diffraction pattern but in some cases they have been shown to contain submicroscopic crystalline areas. Amorphous silica can be formed by condensation from the vapor phase ejected in volcanic eruptions or by deposition from saturated solutions. Silica is often contained in primitive organisms, plants, or diatoms (diatomite) and remains in the Earth's crust in an amorphous state after their death. Opals have a structure that has been formed from uniform particles of colloidal silica 100-500 nm in diameter. The surface of these particles is highly hydrated, i.e. covered by OH groups. Opals may contain from 6 to 24 % water. The formation process of precious opal consists of three stages: 1) formation of uniform particles, 2) their regular deposition, 3) gluing them together. In nature, the process of making an opal takes a very long time [2].

Aqueous Silicates



The dissolution of silica involves a chemical reaction of hydrolysis:

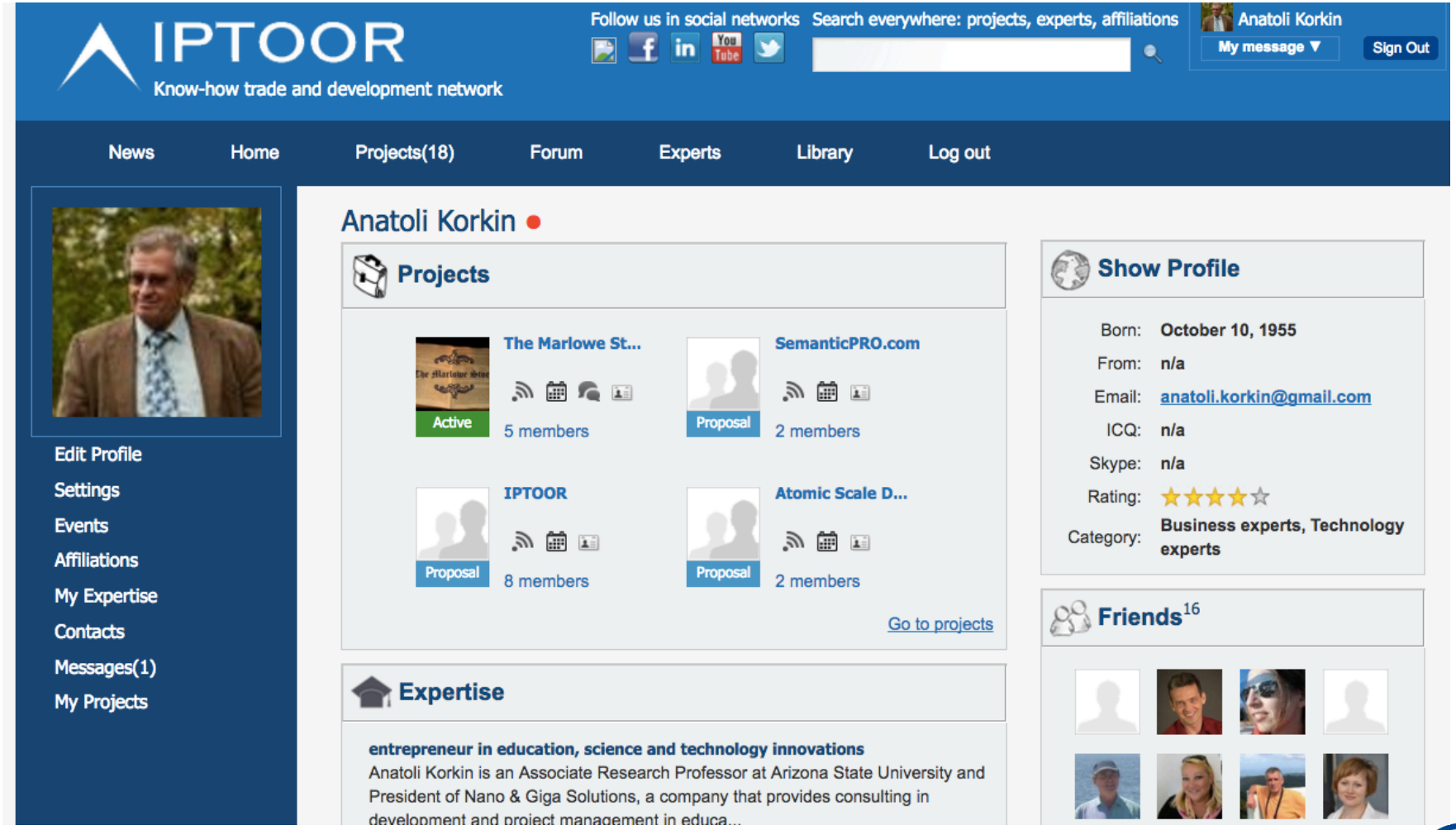
$$SiO_2 + H_2O \rightarrow Si(OH)_4.$$

It is well known that, the solubility of silica in water under normal conditions is very low: The equilibrium concentration of amorphous SiO_2 in water at 25°C is 70 ppm, whereas for crystalline silica, such as quartz, this value is no more than 6 ppm. In order to obtain a supersaturated solution of silica, an elevated temperatures, pressures and a high pH (around 12), should be used [2] The supersaturated solutions are unstable and susceptible to condensation under

IPTOOR

Know-how trade and business development network

https://www.iptoor.com



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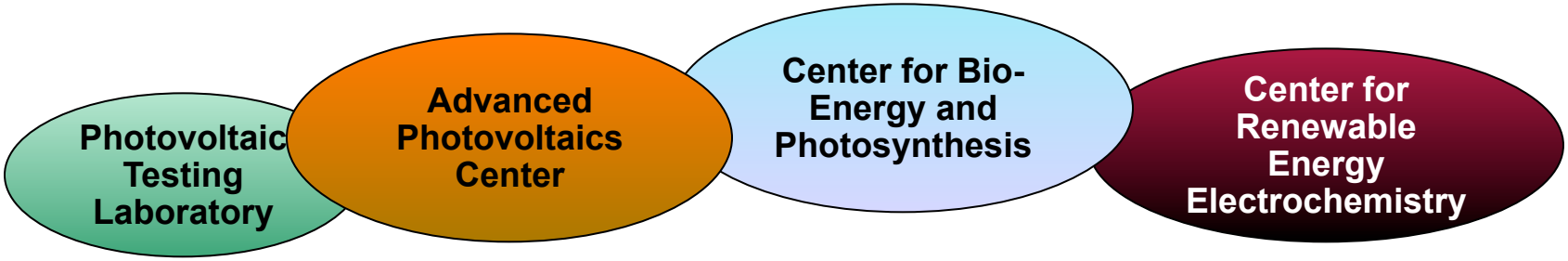
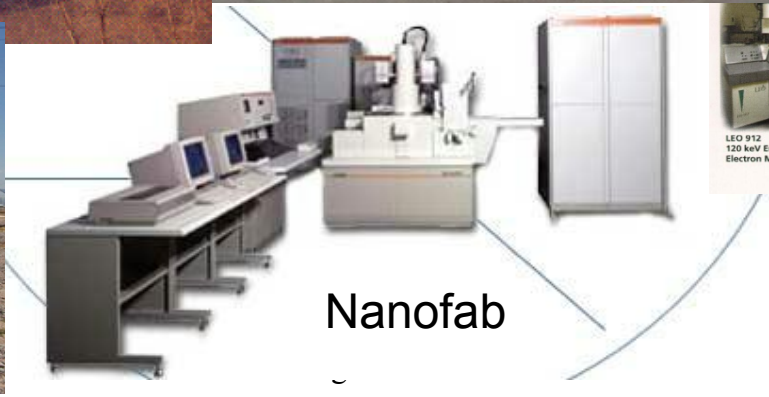
LightWorks

Arizona Initiative for Renewable Energy (AIRE)



Capabilities and Infrastructure

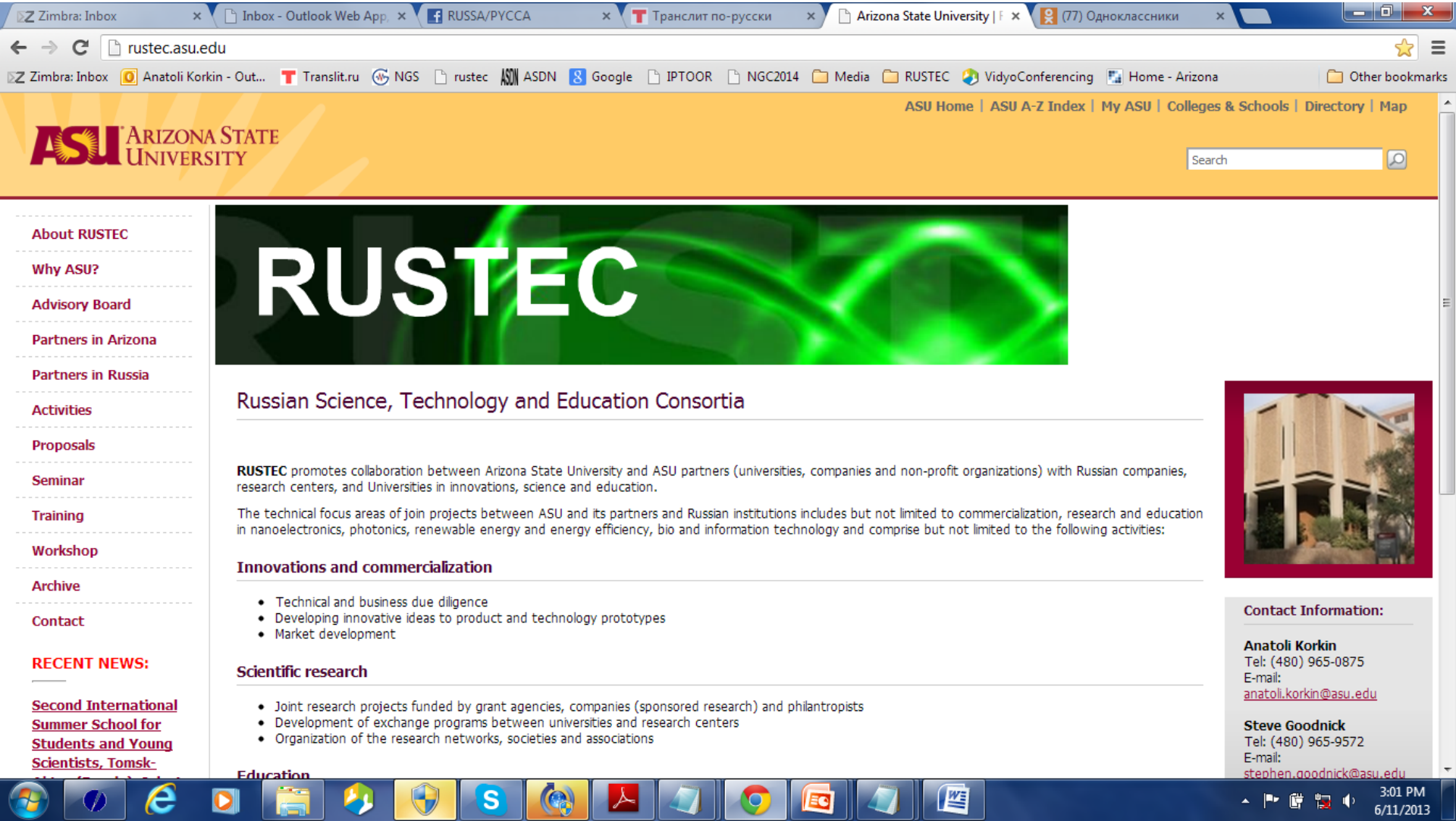


School of Materials

RUSTEC

RUssian Science Technology and Education Consortia

https://rustec.asu.edu



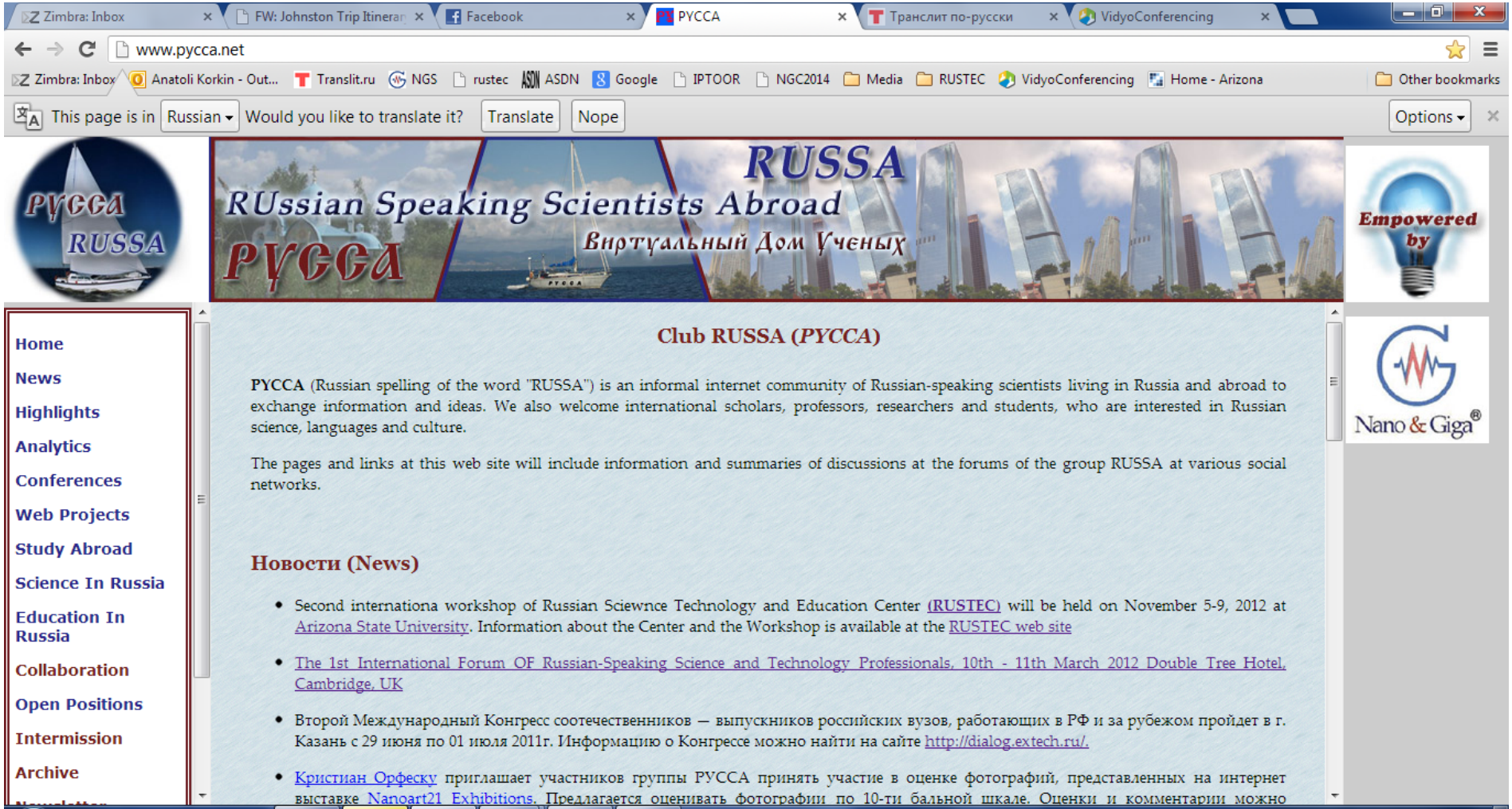
RUSSA

RUssian-Speaking Scientists Abroad

https://www.pycca.net

American-Russian Chamber of Commerce of Minnesota

https://www.arccom.org



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ARCCoM- The American-Russian Chamber of Commerce of Minnesota

The American-Russian Chamber of Commerce of Minnesota (ARCCoM) is a nonprofit, non-political organization organized to promote trade and commerce between the United States, Russia, and

International Projects

General consideration: What is important?

- Knowledge of laws and culture in the countries of operations
- Matching interests and objectives of key experts and teams
- Regular communication and control of deliverables
- Operational freedom (micromanagement is a killer!)
- Staying focused but not narrow minded
- Professionalism in business and loyalty in relations