

Andrei Kalinichev  
External VIP, Postdoc, Postdoc, AIAS-AUFF Fellow  
Aarhus Institute of Advanced Studies  
Department of Biology - Microbiology  
Department of Biology - Microbiology  
Department of Biology - Microbiology  
**Type of address: Postal address.**  
Høegh-Guldbergs Gade 6B  
8000  
Aarhus C  
Denmark



**Type of address: Postal address.**  
Ny Munkegade 116  
1540, 028  
8000  
Aarhus C  
Denmark

**Type of address: Postal address.**  
Ny Munkegade 116  
1540  
8000  
Aarhus C  
Denmark

**Type of address: Postal address.**  
Ny Munkegade 116  
8000  
Aarhus C  
Denmark  
**Email:** akalinichev@aias.au.dk

## Curriculum Vitae

### Grants and projects

#### *Grantee and principal investigator*

- 2022–2023 Russian Science Foundation (RSF), Development of a method for the analysis and classification of ink compositions on paper substrates using selective extraction and digital color analysis, €30 000  
2019–2021 Russian Foundation for Basic Research (RFBR), Generalization of the theory of polymeric optochemical sensor response involving electrical boundary potential as a universal instrument for controlling sensor characteristics, €12 000  
2021 Committee on Science and Higher Education (CSHE), Development of a method for the analysis and classification of writing compositions on paper substrates using methods of selective extraction and digital color analysis, €1400  
2019 Academy of Finland, The influence of the lipophilicity of the membrane components on the electrochemical properties of ultra-thin membranes containing ionophores, Åbo Akademi, Turku, Finland, €7000  
2015–2017 Foundation for Assistance to Small Innovative Enterprises, Development of a miniaturized platform based on optochemical sensors for in vitro electrolyte analysis of microscopic biological fluids samples, €5000

#### *Co-investigator*

- 2020–2023 RSF, Development and experimental validation of calibration-free optical sensors potentially applicable for early express-diagnostics of cystic fibrosis  
2019–2021 RFBR, The influence of the heterogeneity of membrane materials on the electrochemical properties of sensor membranes containing neutral and charged ionophores  
2018–2020 RSF, Miniaturized multianalyte optochemical platform for autonomous in situ monitoring of hydroponic nutrient solutions

#### *Small personal grants*

- 2020 CSHE, Development of a miniaturized platform based on optochemical sensors for multicomponent autonomous in situ monitoring of nutrient solutions for hydroponics, €500  
2019 SPbU travel grant, Matrafured 2019 conference, €500  
2018 SPbU travel grant, Eurosensors 2018 conference, €600  
2018 CSHE, Development of an analyzer device based on optical sensors for in vitro express he salt composition of biological fluids microsamples, €500

### Start-up projects

- 2016–2017 SPbU start-up project (CEO), Express-test system based on ion-selective optical sensors in medical diagnostics, €4000

### Patents

2019 M.A. Peshkova, A.V. Kalinichev, D.I. Dekina, Method for determining lead(II) in water and biological samples (Patent RU2682162C1)

### Awards and scholarships

2020–2021 President of the Russian Federation scholarship for young scientists and graduate students  
2019–2021 Government of the Russian Federation scholarship for young scientists and graduate students  
2019 1<sup>st</sup> degree Diploma at “Mendeleev 2019” conference (best oral presentation, analytical chemistry)  
2017 2<sup>nd</sup> degree Diploma at “Lomonosov 2017” conference (oral presentation, physical chemistry)  
2017 3<sup>rd</sup> degree Diploma at competition of business-cases “Challengence >> Danone One-Day Lab”

### Teaching experience at university

2020–2023 Educational Practice. Analytical Material Science (bachelor course, 60 h)  
2020–2023 General thermodynamics: tutorials (bachelor course, 22 h)  
2019–2023 Physical Chemistry: laboratory classes (bachelor course, 120 h)  
2019–2023 Physical Chemistry: tutorials (bachelor course, 52 h)  
2014–2023 Students' project (co)-supervising (13 courseworks, bachelor course)  
2016 Analytical Chemistry: laboratory classes (bachelor course, 20 h)

### Teaching experience at high school

2019–2023 Member of the Methodological Commission “St. Petersburg Olympiad in Chemistry”, physical chemistry section  
2019–2023 Member of the expert committee of the Chemistry Olympiad “Formula of Unity”  
2018–2021 Teacher of scientific department at All-Russian educational center for gifted children “Sirius”

### Administration

2022 Member of organizing committee of XLVI All-Russian Scientific and Practical Conference of Schoolchildren in chemistry  
2019 Member of organizing committee of International conference of young scientists on chemistry “Mendeleev 2019”  
2017–2019 Jury member of National High School Chemical Tournament  
2012–2019 Member of organizing committee of International natural sciences tournament and National High School Chemical Tournament  
2015 Member of organizing committee of International conference of young scientists on chemistry “Mendeleev 2015”

### Summary of own research

During the past nine years, I have been working with optical chemical sensors, specifically with (chromo)ionophore-based bulk ion-selective optodes, which have the potential for use in different spheres of science and technology. My Ph.D. thesis was dedicated to developing an extended theory of the response of polymeric optodes for predicting and modifying the analytical characteristics of the sensors being designed. The practical significance of my Ph.D. can be formulated as follows:

- the developed theory makes it possible to perform computer simulation of optodes response to identify their potential new uses, to tune the response characteristics for solving specific analytical problems, to optimize *a priori* a quantitative optode composition for reducing trial experiments;
- the quantitative description of co-extraction on the response of cation-selective optodes allows a more comprehensive approach to analyzing the results obtained using optodes and allows to reduce the possibility of misinterpretation of these results;
- the developed polymeric optode-like color standards allow improving digital color analysis significantly by obtaining more accurate results as compared to the use of conventional white/gray standards;
- the developed protocol of analysis using optodes in a non-equilibrium measurement mode can significantly reduce the analysis time without notable losses in response characteristics and accuracy.