

# Sergey Kucheryavskiy

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PhD, Assistant Professor

Department of Biotechnology, Chemistry & Environmental Engineering

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## Common information

*Date of birth:* 19.03.1976

*Nationality:* Russian

*Significant other:* Elena Kucheryavskaya

*Children:* Mikhail Kucheryavskiy (2009)

*Spoken languages:* Russian (native), English (fluent), Danish (can read)

## Education

1997 – M.Sc. in Physics, Altai State University, Barnaul, Russia.

Title of diploma: “Using Walsh-Hadamard transformation for texture analysis”

2001 – Ph.D. (physics, mathematics), Altai State University, Barnaul, Russia.

Title of theses: “Using fractal analysis for investigation of structure of porous metal materials”

## Professional experience

### Aalborg University

2007–pr. Assistant Professor, Department of Biotechnology, Chemistry & Environmental Engineering, Section for Chemical Engineering.

### Altai State University

2003–2007 Associate Professor, Department of Experimental Physics and Electronics, Faculty of Physics.

2001–2003 Assistant Professor, Department of Experimental Physics and Electronics, Faculty of Physics.

1996–2001 Network and System Administrator, IT department.

## Teaching experience

The teaching experience mainly covers all aspects of data analysis (from elementary statistics to advanced methods, like neural networks and support vector machines), image processing and analysis and various IT disciplines.

## **Aalborg University**

*Image processing and analysis* – official PhD course given for AAU Doctoral School, April–May, 2010 (4 ECTS).

*Chemometrics* (introduction to multivariate data analysis) – MS course for 7<sup>th</sup> semester students, together with Kim Esbensen.

*Chemometrics* (introduction to multivariate data analysis) – PhD course for Institute 18, spring, 2009, together with Kim Esbensen.

*Image processing and analysis* – international PhD course given at AAUE, November, 2009.

*Introduction to Matlab* – a two days course for PhD students and staff from Institute 18, November, 2009, together with Munsoor Hanifa.

Also consulting AAUE students with questions of analysis of experimental data and being examination and project censor.

## **Altai State University**

*Modern methods of data analysis* – MS course for 9<sup>th</sup> semester students, 2003–2007.

*Image processing and analysis* – MS course for 7<sup>th</sup> semester students, 2002–2007.

*Introduction to network technologies* – a basic course for 3<sup>rd</sup> semester students from Computer Science department, 2004–2007.

*Computer Graphics* – MS course for 8<sup>th</sup> semester students from Computer Science department, 2005–2007.

*Operational systems and programming languages* – a basic course for 2<sup>nd</sup> semester students, 2003–2005.

In 2002–2007 supervised 20 BS and 15 MS projects as well as 1 PhD project “Classification and analysis of medical images based on soft models”.

## **Computer skills**

*Programming:* MatLab, Python, PHP, C, Java.

*Web-technologies:* HTML/XHTML, CSS, XML, JavaScript/DOM.

*System and networks administration:* FreeBSD/Linux (OS, samba, network services), experienced with all Windows family OS and last versions of Mac OS X. Strong skills in TCP/IP networks. Five years of networks and system administration in Altai State University (1 800 personal computers, 8 campuses, ~ 20 servers). One year experience as a system administrator of Aalborg University, campus Esbjerg.

## **Research interests**

Data analysis and data mining, multivariate data analysis, image and signal processing and analysis, spectroscopy and chemical imaging, process analytical technology (PAT), scientific programming.

## **Research experience**

### **Research activity and projects for last 3 years**

Developing of new methods and tools for multivariate image analysis.

Developing of new methods for analysis of non-isotropic and quasi-isotropic images and textures.

Image analysis in medicine and biology – recognition of white blood cells, analysis of trabecular bones structure for age estimation in forensic medicine, analysis of MRI images of patients with Alzheimer disease.

Analysis of hyperspectral satellite and aerial images.

PANOPOD project, together with J&M Analytik, Germany. The project is devoted to developing of analytical tools for monitoring and control (in-line, on-line) of various pharmaceutical processes.

Project "Distance learning course in Chemometric for technological and natural-science mastership education". The project has been granted by the Nordic Council of Ministers, the Norwegian Centre for International Cooperation in Higher Education (NMR-RU 78/08) and implemented in the frameworks of the Programme: Nordic-Russian Cooperation in Education: Preparatory Actions 2008.

### **Organizing of international conferences**

Seventh Winter Symposium on Chemometrics (WSC-7), St. Petersburg, Russia, February 15—19, 2010: Member of organizing committee.

Sixth Winter Symposium on Chemometrics (WSC-6), Kazan, Russia, February 18—22, 2008: Member of organizing committee.

Fifth Winter Symposium on Chemometrics (WSC-5), Samara, Russia, February 18—23, 2006: Member of organizing committee.

Fourth Winter Symposium on Chemometrics (WSC-4), Chernogolovka, Russia, February 15—18, 2005: Member of organizing committee.

Second Winter Symposium on Chemometrics (WSC-2), Barnaul, Russia, February 28—March 6, 2003: Science Secretary.

### **Peer reviewer**

Chemometrics and Intelligent Laboratory Systems

Geo-Marine Letters

## **Doctoral opposition**

Has served as opponent at 1 Ph.D. creation: Alexander Antropov, Altai State Technical University (Russia), “Developing of models, algorithms and software for forecasting demographic status in small cities in Russia” (11.09.2006).

## **Publications**

### **Articles in journals and proceedings**

1. Ole Grøn, Susanna Palmer, Frans-Arne Stylegar, Kim Esbensen, Sergey Kucheryavski and Sigurd Aase. Interpretation of archaeological small-scale features in spectral images. *Journal of Archaeological Science*, 2010 (in print, DOI: 10.1016/j.jas.2009.11.023).
- Kucheryavskiy S., Esbensen K., Bogomolov A. Monitoring of pellet coating process with image analysis—a feasibility study. *Journal of Chemometrics*, v. 24, 2010, pp. 472-480. (DOI: 10.1002/cem.1292).
2. Kucheryavski S., Belyaev I. Classification and analysis of non-isotropic images by Angle Measure Technique (AMT) with contour unfolding. *Analytica Chimica Acta*, v. 642 (1-2), 2009. pp. 135-141. (DOI: 10.1016/j.aca.2008.12.016).
3. Rodionova O., Kucheryavskiy S., Marks C. Symposium Report: 6th Russian Winter Symposium on Chemometrics (WSC-6). *Chemometrics and Intelligent Laboratory Systems*, v. 96 (1), 2009. pp. 98-100. (DOI: 10.1016/j.chemolab.2008.10.008).
4. Kucheryavski S., Belyaev I., Fominykh S., Estimation of age in forensic medicine using multivariate approach to image analysis. *Chemometrics and Intelligent Laboratory Systems*, v. 97 (1), 2009. pp. 39-45. (DOI:10.1016/j.chemolab.2008.07.011)
5. Yankovskiy V.E., Kucheryavski S., Belyaev I., Fominykh S. Using multivariate image analysis of trabecular bones for age estimation. *Problems of medicine expertise*, v. 2 (30), 2008. pp. 8-11. (in Russian).
6. Ole Grøn, F. Stylegar, S. Palmer, S. Aase, P. Orlando, S. Kucheryavskiy, K. Esbensen. Practical Use of Multispectral Satellite Images in general Norwegian Cultural Heritage Management and focused Viking Age Research. 2008. Proceedings of First EARSeL International Workshop “Advances in Remote Sensing for Archeology and Cultural Heritage Management”, Rome, Italy, 21-24, October, 2008.
7. Kucheryavski S., et al. Optimal Corrections for Digitization and Quantification Effects in Angle Measure Technique (AMT) Texture Analysis. *Journal of Chemometrics*, v.22 (2008) pp. 722-737. (DOI: 10.1002/cem.1118).
8. Kvaal K., Kucheryavski S., Maths Halstensen, Simen Kvaal, Andreas S. Flø, Pentti Minkkinen, Kim H. Esbensen. eAMTexplorer – a comprehensive software for texture and signal characterization using Angle Measure Technique. *Journal of Chemometrics*, v.22 (2008) pp. 717-721. (DOI: 10.1002/cem.1160).

9. Kucheryavski S.V., Polyakov V.V. Material's structure investigation using multivariate data analysis. *Industrial Laboratory and Material Diagnostic*. N 8, v. 73, 2007. pp. 32-36. (in Russian).
10. Kucheryavski S. Using hard and soft models for classification of medical images. *Chemometrics and Intelligent Laboratory Systems*, 2007, v. 88 (1), pp. 100-106. (DOI: 10.1016/j.chemolab.2006.08.012)
11. Kucheryavski S.V., Belyaev I.A., Pijanin A.I., Zhukova E.N., Mukhortova O.A. Using principal component analysis for blood cell classification. *Clinical and Laboratory Diagnostic*. 2006. N 9. pp. 53-54. (in Russian)
12. Kucheryavski S.V. *Process Analytical Technology. Quality Control Methods*. Moscow. 2006. N 5, pp. 12-17. (in Russian)
13. Kim H. Esbensen, Alexey Pomerantsev, Oxana Rodionova and Sergei Kucheryavski. Symposium report: 5th Russian winter symposium on chemometrics. *Chemometrics and Intelligent Laboratory Systems*, 2006, v. 83, pp. 180-181.
14. Kucheryavski S., Polyakov V., Govorov A. Analysis of simulated fracture surfaces using AMT and fractal geometry methods. *Progress in Chemometrics Research*. (Eds: Pomerantsev A.L.). Nova Science Publishers, Inc., USA. 2005. pp. 3-11.
15. Kucheryavski S.V., Suranov A.Ya. Network technologies. Creating network applications in LabVIEW. Barnaul. Altai State University. 2005. 72 p. (in Russian)
16. Kucheryavski S.V., Ployakov V.V., Govorov V.V. AMT analysis of simulated fracture surfaces. *The News of Altai State University*. 2005. N 1. pp. 120-123. (in Russian)
17. Kucheryavski S., Marks C., Varmuza K. Meeting report: Fourth winter symposium on chemometrics – WSC4. *Chemometrics and Intelligent Laboratory Systems*. 2005. № 78. pp. 138-139.
18. Kucheryavski S., Esbensen K. Fracture surface characterization of porous materials: fractal geometry vs. AMT (Angle Measure Technique). *Proceed. of 11th International Conference on Fracture*. Torino, Italy. 2005.
19. Polyakov V.V., Kucheryavski S.V., Egorov A.V. Fractal analysis of deformation mesostucture of high-porous metal materials. *Physical Mesomechanics*. 2001. V. 4. N 5. pp. 103-106.
20. Polyakov V.V., Kucheryavski S.V. The fractal analysis deformation structure of porous metals. *Proceedings of Intern. conf. «Mesomechanics: foundation and applications» (MESO - 2001) Tomsk*, 2001. pp.116-117. (in Russian)
21. Polyakov V.V., Kucheryavski S.V. The fractal analysis of a porous material structure. *Technical Physics Letters*. 2001. Vol. 27. N 7. pp. 592-593.

22. Polyakov V.V., Kucheryavski S.V., Egorov A.V. Investigation of fractal properties of porous metal materials. Proc. of Europ. Conf. "Euromat-99". Microstructural investigation and analysis (Eds.: D.Jouffrey, J.Svejcar) .Wiley-VCH, Weinheim, Germany. 2000. Vol.4. pp.7-10.

23. Polyakov V.V., Kucheryavski S.V. The fractal analysis of phase and grain boundaries in porous pseudoalloys. The News of Altai State University. 2000. N 1. pp. 88-89. (in Russian)

### **Talks and lectures**

1. Kucheryavski S., Bogomolov A. Monitoring of pellet coating process with multivariate image regression. 11th Scandinavian Symposium on Chemometrics, Norway, Loen, June, 8-11, 2009.
2. Kucheryavski S. Introduction to Chemometrics. Key lecture at International conference Methodological aspects of Chemometrics teaching in Europe (including Russia). Russia, St. Petersburg, February 11, 2009.
3. Kucheryavski S. Image analysis in Chemometrics. Key lecture at Sixth Winter School on Chemometrics. Russia, Kazan, February 18-22, 2008.
4. Kucheryavski S. Using black and white models for classification of medical images. Fifth Winter Symposium on Chemometrics. Russia, Samara, February 18-23, 2006.
5. Kucheryavski S. Modern methods of multivariate data classification. Invited lecture on chemometrics school in Samara State Technical University. Samara, Russia. February 16, 2006.
6. Kucheryavski S., Esbensen K. Fracture surface characterization of porous materials: fractal geometry vs. AMT (Angle Measure Technique). 11th International Conference on Fracture. Torino, Italy. March, 20-25 2005.
7. Kucheryavski S. Multivariate Image Classification: Comparison of AMT and Transform Based Methods. Fourth Winter Symposium on Chemometrics. Russia, Chernogolovka, February 15-18, 2005.
8. Kucheryavski S. Multivariate data classification. Invited lecture on chemometrics school in Institute of Problems of Chemical Physics. Chernogolovka, Russia. February 14, 2005.
9. Kucheryavski S., Polyakov V., Govorov A. The analysis of fracture surfaces of porous metal materials using AMT and fractal geometry methods. Third Winter School on Chemometrics. Russia, Pushkinskiye Gory, February 16-20, 2004.
10. Kucheryavski S. Fractal analysis of the deformation structure of porous pseudoalloys. Second Winter School on Chemometrics. Belakurikha, Russia. February 28 – March 04, 2003.

11. Kucheryavski S., Polyakov V. Using fractal geometry methods for analysis of fracture surfaces of porous iron. *Fractals and Applied Synergetics*. Moscow, Russia. November 26 – 30, 2001.
12. Polyakov V.V., Kucheryavski S.V. The fractal analysis deformation structure of porous metals. Intern. conf. “Mesomechanics: foundation and applications” (MESO - 2001) Tomsk, September, 2001.
13. Polyakov V., Kucheryavski S. Fractal analysis of phase and pore boundaries in porous metals. *Fractals and Applied Synergetics*. Moscow, Russia. October, 18 – 21, 1999.
14. Polyakov V.V., Kucheryavski S.V., Egorov A.V. Investigation of fractal properties of porous metal materials. European Conference “Euromat-99”. Germany, September 27 – 30, 1999.
15. Polyakov V.V., Kucheryavski S.V. Computer analysis of deformation structure of porous metals. IV International conference “Evolution of defect structure in condensed matters”. Barnaul, October, 1998.