

NANYANG TECHNOLOGICAL UNIVERSITY

Name : Olga SOURINA

School : EEE

Date of 1st Appointment: 1 December 2001

Present Appointment : Assistant Professor

Division : Information Engineering

Academic Qualifications:

MEng - Moscow Engineering Physics Institute – 1983

PhD - Nanyang Technological University - 1998

Professional Qualifications/Memberships:

Elevated to Senior Member of IEEE from April 2010

Member of Biomedical Engineering Society (Singapore) from 2008

Member of IEEE Computer Society from 1.01.2004

Summary of Working Experience:

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|-----------|---|
| 1/12/2001 | Asst Prof, |
| Currently | Division of Information Engineering, EEE,
NTU, Singapore |
| 1999–2001 | Senior Scientist
Institute of Computing for Physics and Technology, Russia |
| 1998–1999 | Research Fellow
Centre for Graphics and Imaging Technologies
SCE, NTU, Singapore |
| 1994–1997 | Research Student
SCE, NTU, Singapore |
| 1988–1993 | Research Fellow
Dept. of System Analysis
Moscow State Engineering Physics Institute, Russia |
| 1983–1988 | Senior Software Engineer / Software Engineer,
Dept. of System Analysis
Moscow State Engineering Physics Institute, Russia |

TEACHING

My teaching portfolio includes the following subjects:

- E4791, IC0205 Database Systems
- E4706 Object-oriented Software Engineering Analysis and Design (Java, Eclipse)
- FE8706 Object-oriented Programming Part II (C++,)
- E457N Software Engineering
- FE8001 Computing
- E406 Object-Oriented Design (C++).
- EE3072 (P312) Microprocessor Applications lab
- Discrete Mathematics
- Computer Graphics
- Computer Graphics and Virtual Reality

Text-books

- A.Sourin, **O.Sourina**, S.Klimenko, *Computer Graphics and Virtual Reality. Lecture Notes*, IPTI, Russia, (in English), ISBN 5888350060, 2004.
- A.Sourin, **O.Sourina**, S.Klimenko, *Computer Graphics and Virtual Reality. Exercises and Laboratories*, IPTI, Russia, (in English), ISBN 5888350079, 2004.

Adoption: These books were adopted for teaching “Computer Graphics and Virtual Reality” at the Department of System Integration and Management, Moscow Institute of Physics and Technology, Russia, 2004-current.

Graduate students supervision

- 1 PhD student graduated in 2008.
- 1 MSc student graduated in 2008
- 2 MSc students graduated in 2009
- 2 MSc students graduated in 2010
- 3 PhD students started from August 2009 (2 with PhD scholarships from my projects (PI, co-PI, and 1 IMI-PhD student)
- 2 MSc Students -currently

Teaching Recognitions

- 2008/ Commendation from CED Director for Invited Talk at NTU Teaching and Learning Seminar “From Good to Great 2008”
- 2005/06 - FYP project under my supervision "Programming Tools for Data Mining in Molecular Dynamics" was awarded the DSTA Gold Medal.
- I receive commendation letters from undergraduate students taking my courses. (Examples are given in my CV).

RESEARCH

My research is interdisciplinary, including Interactive Digital Media IDM (particularly my research area is in visual data mining, virtual reality, EEG-based immersion, and visual and haptic interfaces), and Biomedical Engineering (visual haptic based molecular docking for drug design, virtual surgery, visual analysis and quantification of brain responses, EEG-based emotion recognition). All my projects involve collaboration between SBS, MAE, SCE, medical doctors from SGH (Singapore General Hospital), NUH (National University Hospital), and NNI (National Neuroscience Institute), Tan Tock Seng Hospital (TTSH), and local industry like VedaRAM Pte Ltd, VisualFactory Pte Ltd, etc.

Top 10 from 88 most significant publications

1. **Sourina O**, Boey SH. *Geometric Query Types for Data Retrieval in Relational Database*. Data&Knowledge Engineering, 27(2): 207 – 229, 1998. This is a foundation paper on my function-based visual query model.
2. Sourin A, **Sourina O**, Howe TS. *Virtual orthopedic surgery training*. IEEE Computer Graphics & Applications, 20(3):6-9, 2000.
3. **O. Sourina**, N. Korolev, *Visual Mining and Spatio-Temporal Querying in Molecular Dynamics*, Special issue on Computational Intelligence for Molecular Biology and Bioinformatics of the Journal of Computational and Theoretical Nanoscience, American Scientific Publishers, 2(4):492-498, 2005.
4. Prasolova-Førland E, Sourin A, **Sourina O**. *Cybercampuses: Design Issues and Future Directions*. The Visual Computer, Springer, 22(12):1015-1028, 2006. **(authors are in alphabetical order)**
5. Kulish, VV, Sourin, AI, **Sourina, O**. *Human electroencephalograms seen as fractal time series: mathematical analysis and visualization*. Computers in Biology and Medicine, Elsevier, 36(3):291-302, 2006. **(authors are in alphabetical order)**
6. **Sourina O**. *Visual Spatio-temporal Function-based Querying*. The Visual Computer, 23(5): 335-346, 2007.
7. **Sourina O**, Sourin A, Howe TS. *Orthopedic Surgery Simulation*. Journal of Mechanics in Medicine & Biology. World Scientific, 7(1):37-53, 2007
8. D. Liu, G. V. Nosovskiy, **O. Sourina**, *Automatic Clustering & Boundary Detection Algorithm Based on Delaunay Triangulation*, Pattern Recognition Letters, Vol 29/9, pp 1261-1273, 2008 **(authors are in alphabetical order)**
9. **O. Sourina**, J. Torres, J. Wang, *Visual Haptic-based Biomolecular Docking and its Applications in E-learning*, Transactions on Edutainment II, LNCS 5660, Springer-Verlag, pp.105-118, 2009
10. Y. Liu, **O. Sourina**, M. K. Nguyen, *Real-Time EEG-based Human Emotion Recognition and Visualization*. In Proc. 2010 Int. Conf. on Cyberworlds, Singapore, 20-22 Oct, 2010, in print.

Research Awards

- 2010 Elevated to Senior Member of IEEE (**only 8% of the approximately 388,000 IEEE members hold this grade which requires experience reflecting professional maturity and significant professional achievements**)
- 2007 Manpower award from the Director of Research
- 2005 Research Outstanding and Award Recognition (ROAR), Biomedical Engineering Centre of Biomedical & Pharmaceutical Engineering (BPE) Cluster in NTU
- 1994 PhD Scholarship from SCE, NTU
- 1987 Silver Medal of the USSR Exhibition Centre for the computer graphics software exhibit (national prize)
- 1985 Honorary Diploma of the Academy of Sciences of the USSR
- 1984 Medal of the Ministry of Higher Education of the USSR for the Best Student's Research Project

International Recognitions

- I am a Program Chair of International Conference on Cyberworlds 2010, 20-22 Oct, Singapore
- As recognition of my breakthrough contribution to brain study I was invited as a keynote speaker at the TOP-TIER conference Computer Graphics International CGI 2010, 9-11 June, Singapore "Emotion-based Personalised Digital Media Experience".
- As recognition of my contribution to haptic-based molecular docking I was invited as a keynote Speaker at COST D37 Action "GridChem" ELAMS-QDYN Joint WG Meeting at Aristotele University, Thessaloniki, Greece, May 27-28, 2010 to give a keynote talk on "Molecular Visualization and Haptic-based Biomolecular Docking".
- My paper on Virtual Surgery was a highlight of the IEEE Computer Society web-page May-June 2000.
- My papers presented at the 2007 and 2008 Int. conferences on Cyberworlds were invited to the special issues of TOP-TIER journal The Visual Computer.

1 Software product is used in SGH

2002-2010/ My software *Orthopaedics Surgery Simulator* is used in Singapore General Hospital (Dr. T. S. Howe) in orthopaedics surgery student training and preoperative planning

Achievements earning significant publicities for the University

- In 2007 the project on Modeling and Quantification of Brain Response to External Stimuli was publicized:
 - Straits Times interview on my project on Modeling and Quantification of Brain Response to External Stimuli on 12.05.07.
 - article in "TODAY" newspaper on 28.04.07, page 8
 - video story on my research project on Modeling and Quantification of Brain Response to External Stimuli on the TV news "Channel NewsAsia" (June, 2007)
[http://www.ntu.edu.sg/corpcorpmms2/clips/hi_res/090707_CNA_2200\(hi\).wmv](http://www.ntu.edu.sg/corpcorpmms2/clips/hi_res/090707_CNA_2200(hi).wmv)

Service as editor and associate editor for international journals

- An Associated Editor of "Sunway College Journal", Malaysia, 2004-2006
- Member of the Editorial Board of the international journals:
 - "Computer Graphics & Geometry", Russia (in English), 2003-current
 - "Journal of Geographic Information System", 2009-current

Keynote talks at industrial workshops

- 2007/ Invited Speaker at National Neuroscience Institute, "Modeling, Analysis, and Quantification of the Brain Response", 4.05.2007.
- 1998/ Invited Speaker at Singapore General Hospital Workshop, "Virtual Orthopaedic Surgery",

November, 1998

Invited presentations at scientific meetings

- 2009/ Talk on “Neurofeedback Games for Medical Applications in Co-Spaces” in NTU-COE Workshop in Engineering in Medicine (A partnership with the Tan Tock Seng Hospital (TTSH), 26 Nov 2009
- 2009/ Invited Speaker at the Cognitive Science Seminar series, Organized by the Cognitive Science Group in Temasek Laboratories, NUS, “Emotion-based, and Haptic-based Interactions with Digital Media”, 30 July 2009.
- 2008/Invited Speaker at NTU-Sweden Interactive Media Workshop, “ Emption-based personalized digital experience”, 16.09.2008
- 2008/ Invited Speaker at NTU Teaching and Learning Seminar “From Good to Great 2008”, 27.02.2008
- 2002/ Invited Speaker at Science, Technology & Biomedicine Month - Science.02 Focus Seminar, Signal Processing and Virtual Reality for Biomedical Applications, EEE, 5 September 2002.

International Conference Program Committee

- IPC member of 24 international conferences including CW2007,08,09,10; IADIS CGV2007,09 U-Media 2008; ICCSA 2007, 08, 09, 10; ICICS 07, 09; ENGAGE 2010
- Session chairman and special session organizer in 11 international conferences.
- Reviewer of 28 international conferences (including Eurographics), and 7 international journals (including Pattern Recognition, Information systems, etc).

Current Research Funding

NRF2008IDM-IDM004-020. Emotion-based personalised digital media experience in Co-Spaces, 3 years, 2008-2011. PI

ARF (RG10/06): Visual and Force Feedback Simulation in Nanoengineering and Application to Docking of Transmembrane α - Helices. 3 years, 2006-2010, PI

RGM25/07 Manpower fund. Visual Haptic-based Molecular Docking, 1 year, 2007-2009, PI

NRF2008IDM-IDM004-002. Visual and haptic rendering in Co-Space. 3 years, 2008-2011, Co-PI.

Project: ARF (RG27/06) Investigation, Modeling and Quantification of Brain Response to External Stimuli. 3 years, 2006-2010, Collaborator

Completed

A*STAR funded joint pilot project with SIMTech: Automating Integration of Manufacturing Service Systems, Collaborator
2 years, 2004–2005.

RGM18/07 Biomedical Characterization Techniques and Analysis
1 year, 2007-2008, Co-PI

Projects Submitted (currently are under review)

MOE AcRF Tier1: EEG-based Immersion and 3D Interaction: E-learning, Art, and Medical Application. 1 years, 2010-2011, PI

Other research projects

Dynamic Fractal Dimension Analysis for Neurocritical Care. In collaboration with MAE, NNI

Surgical training in shared virtual spaces. In collaboration with NUH, SCE.

Spatial Data Mining. In collaboration with Moscow State University, Russia.

Neurofeedback for Pain Management In collaboration with Tan Tock Seng Hospital (TTSH)

SERVICE

Service to professional bodies

- Elevated to IEEE Senior Fellow 2010 (April) – current
- Biomedical Engineering Society (Singapore) (member) 2008-current
- NTU Academic Council (member) 2008-current
- IEEE Computer Society (member) 2004-current

Service to society/local industry

- Organizing Committee member of the following conferences in Singapore (NTU level)
2002: ICONIP'02, SEAL'O2, FSKD'02, Singapore, 2003, 2005, 2010 International Conference on Cyberworlds, Singapore, 2004 IEEE International Conference on Image Processing (ICIP), Singapore
- Committee Member of ICT minor program: Development of the program and syllabus 2003-2004
- Committee Member of Task Force - Scholars/Students Care of the School of EEE - 2006
- Committee Member of ICT minor program: Enhancing the program, program advertising in NTU-2008-current
- BEng in Information Engineering and Media (IEM) programme committee, EEE, NTU: Committee member: Enhancing the program; program advertising - 2009-current
- Research Panel of IMI (Institute for Media Innovation) (NTU level): Committee member: reviewing of research proposals – 2010-current
- Consultancy service: external examiner of 2 Database Systems e-learning courses for FTMS Global in Dec. 2002- Feb. 2003.
- Collaboration with Singapore General Hospital (SGH) 1998-current
- Collaboration with National University Hospital (NUH) 2005-current
- Collaboration with National Neuroscience Institute (NNI) 2006-current
- Collaboration with VedaRAM Pte Ltd (a Singapore based company) - Development of biofeedback/neurofeedback games for stress management and performance training 2007-current
- Collaboration with Fusionopolis 11 (IDM) - Installation a demo testbed in Fusionopolis-11 2009-current.
- Collaboration with Tan Tock Seng Hospital (TTSH) 2009 - current