

## PERSONAL INFORMATION



## Jelena Ban

📍 University of Rijeka - Department of Biotechnology

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## WORK EXPERIENCE

October 2016-present

**Assistant Professor**

**Employer's name and locality:** Department of biotechnology, University of Rijeka, Radmile Matejčić 2, 51000 Rijeka ([www.biotech.uniri.hr/en/](http://www.biotech.uniri.hr/en/))

**Business or sector:** Research

**Main activities and responsibilities:** neural development, differentiation and regeneration using primary neuronal cultures and nanopatterned substrates or 3D scaffolds; *molecular and cell biology, fluorescence confocal and atomic force microscopy*

January 2009–June 2016

**Researcher**

**Employer's name and locality:** International School for Advanced Studies (SISSA), Neurobiology Sector, Via Bonomea 265, 34136 Trieste ([www.sissa.it](http://www.sissa.it))

**Business or sector:** Research

**Main activities and responsibilities:** study of the role of the nanopatterned 2D substrates on the differentiation of embryonic stem cell-derived neurons (Nanoscale Project, [www.nanoscale-fp7.eu](http://www.nanoscale-fp7.eu)) and of the 3D scaffolds on the formation and activity of dissociated hippocampal networks (Neuroscaffolds Project, [www.neuroscaffolds.eu](http://www.neuroscaffolds.eu)); *molecular and cell biology, micro-contact printing, fluorescence confocal and atomic force microscopy*

January–December 2008

**Researcher**

**Employer's name and locality:** Glance Vision Technologies, Area Science Park, Ed. Q, S.S.14 Km163.5, 34012 Basovizza (TS) ([www.gvt.it](http://www.gvt.it))

**Business or sector:** Research

**Main activities and responsibilities:** developing of the software for the automated cell counting and study of the role of the substrate roughness on the differentiation of embryonic stem cell-derived neurons; *cell biology, fluorescence confocal and atomic force microscopy*

November 2002–  
December 2007

**PhD student**

**Employer's name and locality:** International School for Advanced Studies (SISSA), Neurobiology Sector, Via Bonomea 265, 34136 Trieste ([www.sissa.it](http://www.sissa.it))

**Business or sector:** Research

**Main activities and responsibilities:** differentiation of murine embryonic stem cell-derived neurons; *cell biology, fluorescence confocal microscopy*

February 2001- October 2002

**Researcher**

**Employer's name and locality:** Tecna S.r.l., Padriciano 99, 34149 Trieste c/o Area Science Park ([www.tecnalab.it](http://www.tecnalab.it))

**Business or sector:** Research

**Main activities and responsibilities:** development, validation and production of test kit for the detection of chemical contaminants in food; *molecular biology, phage display and ELISA*

July 2000- January 2001

**Research Fellowship**

**Employer's name and locality:** Laboratorio Nazionale Consorzio Interuniversitario per le Biotecnologie (LNCIB) ([www.lncib.it](http://www.lncib.it))

**Business or sector:** Research

**Main activities and responsibilities:** study of the muscular *in vitro* differentiation; cell and molecular biology, microinjection, protein analysis, fluorescence microscopy

## EDUCATION AND TRAINING

2002 - 2007

PhD in Functional and Structural Genomics

**Education or training organisation's name:** International School for Advanced Studies (SISSA), Trieste - Italy ([www.sissa.it](http://www.sissa.it))

**PhD thesis title:** "Embryonic stem cell-derived neurons form functional neuronal networks *in vitro*"

1993 - 2000

Master Degree in Biology

**Education or training organisation's name:** Facoltà di Scienze Matematiche Fisiche e Naturali, University of Trieste -

Italy ([www.univ.trieste.it](http://www.univ.trieste.it))

Experimental thesis title: "Ruolo di Gas1 nel differenziamento di mioblasti C2C12 in coltura"

1989 - 1993

High School leaving qualification in classical studies

Education or training organisation's name: Prva rječka hrvatska gimnazija, Rijeka - Croatia ([www.prhg.hr](http://www.prhg.hr))

## PERSONAL SKILLS

Mother tongue(s)

Croatian

Other language(s)

	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken interaction	Spoken production	
Italian	C1/C2	C1/C2	C1/C2	C1/C2	C1/C2
English	C1/C2	C1/C2	C1/C2	C1/C2	C1/C2
German	A1/A2	A1/A2	A1/A2	A1/A2	A1/A2

Levels: A1/A2: Basic user - B1/B2: Independent user - C1/C2 Proficient user

[Common European Framework of Reference for Languages](#)

## Communication skills

I was working for almost 14 years in the international environment of the International School for Advanced Studies (SISSA), Trieste, interacting successfully with senior and junior colleagues.

## Organisational / managerial skills

I have developed international collaborations with the 'Istituto Officina dei Materiali' (IOM) of the Italian National Research Council (CNR), Trieste – Italy ([www.iom.cnr.it](http://www.iom.cnr.it)), École normale supérieure (ENS), Paris – France ([www.ens.fr](http://www.ens.fr)) and Suzhou Institute of Nano-Tech and Nano-Bionics (SINANO), Suzhou – China ([english.sinano.cas.cn](http://english.sinano.cas.cn)), that ended up with the joint scientific publications.

Since 2006 I was teaching, organising and supervising, together with Prof. Vincent Torre, both Master and PhD students' studying differentiation of embryonic stem cell-derived neurons and primary hippocampal dissociated cultures.

Since 2002 I was responsible for the tissue culture room facility, taking care of maintenance of several cell lines and managing the orders of consumables for cell culture and immunocytochemistry.

Also, I was presenting my work at various international scientific congresses.

## Technical skills

**Molecular and Cell Biology:** immunocytochemistry, calcium imaging, DNA transfection, cDNA microarrays, micro-contact printing, PCR, Western blot, microinjection, ELISA  
Fluorescent, confocal and atomic force microscopy

## Digital competence

SELF-ASSESSMENT				
Information processing	Communication	Content creation	Safety	Problem solving
Proficient user	Proficient user	Independent user	Independent user	Independent user

Levels: Basic user - Independent user - Proficient user

[Digital competences - Self-assessment grid](#)

- good command of office suite (word processor, spread sheet, presentation software)
- good command of image processing programs: Fiji/Image J, Corel Draw, Inkscape, Imaging software (JPK Image Processing, HCLImage, Volocity, Leica Confocal Software, Olympus CellSense, Zeiss Zen).

## Didactic skills

### University Teaching

**University of Rijeka, 2016/2017-present:** Advanced microscopy in Neuroscience (principal lecturer); collaborator in General physiology and pathophysiology, Immunology, Microscopy and Molecular Neurobiology of the undergraduate program "Biotechnology and drug research" and Nanomedicine (principal lecturer) of the graduate programme "Biotechnology in medicine", Department of biotechnology ([www.biotech.uniri.hr](http://www.biotech.uniri.hr))

**University of Trieste, 2011:** lecturer; course of General Biology for the degree in "Tecniche di Laboratorio Biomedico" and of the Applied Biology for the degree in "Tecniche di Radiologia Medica per immagini e Radioterapia" c/o Facoltà di Medicina e Chirurgia ([www.med.units.it](http://www.med.units.it))

### Mentorship

**2008:** co-supervisor with Prof. Vincent Torre for the thesis in Master degree in Functional Genomics c/o Dipartimento di Scienze della Vita, University of Trieste of the graduating student **Valentina Di Foggia**, with the title: "Caratterizzazione delle fasi precoci del differenziamento dei neuroni derivati da cellule staminali embrionali di topo"

**2009:** co-supervisor with Prof. Vincent Torre and Dr. Maria Elisabetta Ruaro for the thesis in Master degree in Neuroscience c/o Dipartimento di Scienze della Vita, University of Trieste of the graduating student **Dora Scudieri**, with the title: "Analisi dell'influenza dei substrati di adesione micro-patternati sulla crescita e orientamento dei coni di crescita neuronali"

**2012:** co-supervisor with Prof. Vincent Torre for the PhD thesis in Functional and Structural Genomics c/o SISSA of the PhD student **Lin Thuy Lien**, with the title: "The effect of axon guidance molecules *Sema3A* and *Netrin-1* on rat hippocampal growth cone motility and their interactions with biomaterials"

**2015:** co-supervisor for the thesis in Master degree in Neuroscience (Facoltà di Scienze Matematiche Fisiche e Naturali) of the graduating student **Simone Mortal** c/o l'University of Trieste, with the title: "Live cell imaging of the formation of neural networks"

**2016:** co-supervisor with Prof. Vincent Torre for the PhD thesis in Neurobiology c/o SISSA of the PhD student **Diletta Pozzi** with the title: "The spontaneous activity of organotypic and dissociated neuronal networks"

**2017:** supervisor for the thesis in Bachelor of biotechnology and drug research (Department of biotechnology, University of Rijeka) of the graduating student **Klaudia Hrvatin**, with the title: "Formation of neuronal networks and the role of guidance molecules *Netrin-1* and *Semaphorin 3A*"

**2017:** supervisor for the thesis in Bachelor of biotechnology and drug research (Department of biotechnology, University of Rijeka) of the graduating student **Lea Radošević**, with the title: "Molecular mechanisms of depression"

**2018:** supervisor for the Masters transfer student from Cergy-Pontoise, France, with MSc in Cellular and Molecular Biology of the Microenvironment, University of Cergy-Pontoise of the student **Tatiana Grouin**, with the title: "Identification of the different stage of neuronal cells in the cortex of the neonatal opossum"

**2019:** co-supervisor for the Master student **Tomaž Bembi** from Department of Life Sciences, University of Trieste, Italy, with MSc in Medical Biotechnology, with the title: "Fabrication of micropatterned substrates for neonatal opossum neurons alignment and differentiation"

**2019:** supervisor for the thesis in Bachelor of biotechnology and drug research (Department of biotechnology, University of Rijeka) of the graduating student **Diana Dragičević**, with the title: "Nanotechnology in Neuroscience"

Driving licence B

## ADDITIONAL INFORMATION

### Publications

1. **Jelena Ban**, Paolo Bonifazi, Giulietta Pinato, Frederic Broccard, Lorenz Studer, Vincent Torre and Maria Elisabetta Ruaro: "ES-derived neurons form functional neuronal networks *in vitro*". *Stem Cells*, 2007 Mar 25(3):738-749. DOI: 10.1634/stemcells.2006-0246
2. Gerald James Bakeine, **Jelena Ban**, Gianluca Greci, Alessandro Pozzato, Simone Dal Zilio, Mauro Prasciolu, Luca Businaro, Massimo Tormen, Maria Elisabetta Ruaro: "Design, fabrication and evaluation of nanoscale surface topography as a tool in directing differentiation and organisation of embryonic stem-cell-derived neural precursors". *Microelectronic Engineering*, 2009; 86: 1435–1438. DOI: [10.1016/j.mee.2009.01.032](https://doi.org/10.1016/j.mee.2009.01.032)
3. Shripad Kondra, Jummi Laishram, **Jelena Ban**, Elisa Migliorini, Valentina Di Foggia, Marco Lazzarino, Vincent Torre and Maria Elisabetta Ruaro: "Integration of Confocal and Atomic Force Microscopy Images". *Journal of Neuroscience Methods*, 2009 Feb 15;177(1):94-107. [doi:10.1016/j.jneumeth.2008.09.034](https://doi.org/10.1016/j.jneumeth.2008.09.034)
4. **Jelena Ban**, Elisa Migliorini, Valentina Di Foggia, Marco Lazzarino, Maria Elisabetta Ruaro and Vincent Torre: "Fragmentation as a mechanism for growth cone pruning and degeneration". *Stem Cells and Development*, 2011 Jun;20(6):1031-41. DOI:10.1089/scd.2010.0217
5. Elisa Migliorini, Gianluca Greci, **Jelena Ban**, Alessandro Pozzato, Massimo Tormen, Marco Lazzarino, Vincent Torre and Maria Elisabetta Ruaro: "Acceleration of neuronal precursors differentiation induced by substrate nanotopography". *Biotechnology and Bioengineering*, 2011 Nov;108(11):2736-46. DOI: 10.1002/bit.23232
6. Giulietta Pinato, Linh Thuy Lien, Alessio Ansuini, **Jelena Ban**, Elisa D'Este, Dan Cojoc and Vincent Torre: "Less than 5 Netrin-1 molecules initiate attraction but 200 *Sema3A* molecules are necessary for repulsion", *Scientific Reports*. 2012; 2:675. DOI:10.1038/srep00675
7. Elisa Migliorini, **Jelena Ban**, Gianluca Greci, Laura Andolfi, Alessandro Pozzato, Massimo Tormen, Vincent Torre and Marco Lazzarino. "Nanomechanics controls neuronal precursors adhesion and

differentiation", *Biotechnology and Bioengineering*. 2013; 110: 2301–2310. DOI:10.1002/bit.24880

8. Ladan Amin, Erika Ercolini, **Jelena Ban** and Vincent Torre. "Comparison of the Force Exerted by Hippocampal and DRG Growth Cones", *PLoS One*. 2013 Aug 21;8(8):e73025. DOI: 10.1371/journal.pone.0073025
9. Linh Thuy Lien, **Jelena Ban**, Massimo Tormen, Elisa Migliorini, Gianluca Greci, Alessandro Pozzato and Vincent Torre. "Can Hippocampal Neurites and Growth Cones Climb over Obstacles?", *PLoS One*. 2013 Sep 6;8(9):e73966. DOI: 10.1371/journal.pone.0073966
10. Francesco Paolo Ulloa Severino, **Jelena Ban**, Qin Song, Mingliang Tang, Ginestra Bianconi, Guosheng Cheng and Vincent Torre. "The role of dimensionality in neuronal network dynamics", *Scientific Reports*. 2016 6, 29640; DOI: 10.1038/srep29640
11. Diletta Pozzi, **Jelena Ban**, Federico Iseppon and Vincent Torre. "An improved method for growing neurons: comparison with standard protocols", *Journal of Neuroscience Methods*. 2017 Jan 27;280:1-10. doi: 10.1016/j.jneumeth.2017.01.013.
12. Laura Andolfi, Anna Murello, Damiano Cassese, **Jelena Ban**, Simone Dal Zilio and Marco Lazzarino. "High aspect ratio silicon nanowires control fibroblast adhesion and cytoskeleton organization", *Nanotechnology*. 2017 Apr 18;28(15):155102. doi: 10.1088/1361-6528/aa5f3a.
13. Sisi Li, Francesco Paolo Ulloa Severino, **Jelena Ban**, Li Wang, Giulietta Pinato, Vincent Torre and Yong Chen. Improved neuron culture using scaffolds made of three-dimensional PDMS micro-lattices. *Biomedical Materials*. 2018 Jan 15. doi: 10.1088/1748-605X/aaa777.
14. **Jelena Ban**, Cynthia Sámano, Miranda Mladinic and Ivana Munitic. Glia in amyotrophic lateral sclerosis and spinal cord injury: common therapeutic targets. *Croat Med J*. 2019;60: doi: 10.3325/cmj.2019.60.109

#### Book Chapter

Maria Elisabetta Ruaro, **Jelena Ban** and Vincent Torre: "Characterization of embryonic stem (ES) neuronal differentiation combining atomic force, confocal and DIC microscopy imaging". *Embryonic Stem Cells / Book 3*, InTech - Open Access Publisher, ISBN 978-953-307-632-4, October 2011. DOI: 10.5772/24014

#### Citations

300

h-index 9

i10-index 7

<http://scholar.google.it/citations?user=Ap8yUlsAAAAJ&hl=en>

#### Courses

January 2007: participation at the course "Rischio chimico e rischio biologico" c/o SISSA

March 2007: participation at the seminar held by the Gilson - Italia "Sistemi di pipettaggio manuali Gilson, una qualita' che dura nel tempo" c/o SISSA

May 2016: participation at the workshop: "Leica STED 3X Super Resolution 3D Microscopy", SISSA, Trieste

#### Presentations

Poster exhibition

1. "Development of antibodies against antigens of the *Heterodera schachtii* nematode", VIth International Conference on Agri-Food Antibodies (AFA), **2001**: Society for Food and Agricultural Immunology; Prague, Czech Republic
2. "Functional ES-derived neuronal networks: a comparison with dissociated hippocampal neuronal networks", **2006** EuroStemCell conference, Lausanne, Switzerland, c/o l'Ecole Polytechnique Fédérale de Lausanne ([www.epfl.ch](http://www.epfl.ch))
3. "Response of mouse embryonic stem cell-derived neural precursors to biomaterial surface topology and roughness", Società Italiana di Neuroscienze (SINS), **2007** c/o Palazzo della Ragione and Palazzo della Gran Guardia, Verona, Italy ([www.sins2007.it](http://www.sins2007.it))
4. "Effect of PDMS Nanopatterned Substrates on Embryonic Stem Cells Differentiation into Neuronal Lineage", **2011**, Biophysical Society's 55th Annual Meeting, Baltimore (MA); DOI: <http://dx.doi.org/10.1016/j.bpj.2010.12.3579>
5. "Comparison of the force exerted by hippocampal and DRG growth cones", Biophysical Society's 57th Annual Meeting, **2013** c/o Pennsylvania Convention Center, Philadelphia (PA); DOI: <http://dx.doi.org/10.1016/j.bpj.2012.11.2637>
6. "Hippocampal filopodia but not growth cones can climb over 600 nm steps", Biophysical Society's 57th Annual Meeting, **2013** c/o Pennsylvania Convention Center, Philadelphia (PA); DOI: <http://dx.doi.org/10.1016/j.bpj.2012.11.914>
7. "Role of Myosin II in Motility and in Force Generation of DRG Growth Cones", Biophysical Society's 57th Annual Meeting, **2013** c/o Pennsylvania Convention Center, Philadelphia (PA); DOI: <http://dx.doi.org/10.1016/j.bpj.2012.11.2636>
8. "Localized signaling in neurite outgrowth and axon pathfinding", **2014**; XVIII School of Pure and Applied Biophysics: Nanomechanics of biomolecular adhesion, Venice (Italy) (<http://www.istitutoveneto.it/flex/cm/pages/ServeBLOB.php/L/IT/IDP/897>)
9. "The Role of Arp2/3 in DRG Growth Cones Motility", Biophysical Society's 58th Annual Meeting, **2014**, San Francisco (CA); DOI: <http://dx.doi.org/10.1016/j.bpj.2013.11.314>

10. "3D neuronal networks share some of the complexity of brain dynamics.", 2015; Paris Symposium on Integrated Cell-Material Sciences c/o Institute Pierre-Gilles de Gennes for Microfluidics, Paris, France (<http://www.institut-pgg.fr/index.asp?id=254>)
11. "New in vitro preparations of opossum *Monodelphis domestica* to study neuronal regeneration and neuroprotection", FENS Forum of Neuroscience, Berlin (Germany) 7.-11.7.2018. [https://ep70.eventpilot.us/web/page.php?page=IntHtml&project=FENS18&id=abstract\\_36107](https://ep70.eventpilot.us/web/page.php?page=IntHtml&project=FENS18&id=abstract_36107)

#### Conferences

1. 3<sup>rd</sup> Symposium: Basic and translational Neurochemistry: Glia and neurons in health and disease; Department of Clinical and Transplantation Immunology and Molecular Medicine in Rijeka, The Croatian Academy of Sciences and Arts and Department of Biotechnology, University of Rijeka; July 7, 2014 ([www.uniri.hr/index.php?option=com\\_content&view=article&id=4178:glia-i-neuroni-u-zdravlju-i-bolesti&catid=89:arhiva-vijesti&Itemid=176&lang=hr](http://www.uniri.hr/index.php?option=com_content&view=article&id=4178:glia-i-neuroni-u-zdravlju-i-bolesti&catid=89:arhiva-vijesti&Itemid=176&lang=hr))
2. 20th Young Neuroscientist Meeting. Department of Biotechnology, University of Rijeka; June 30, 2016. ([www.biotech.uniri.hr/files/Radionice/Susret\\_mladih\\_neuroznanstvenika.pdf](http://www.biotech.uniri.hr/files/Radionice/Susret_mladih_neuroznanstvenika.pdf))
3. 14<sup>th</sup> Symposium: "TRANSLATION OF BASIC IMMUNOLOGY AND NEUROSCIENCE TOOLS TO THERAPIES: Where Are We Now? ". Department of Clinical and Transplantation Immunology and Molecular Medicine in Rijeka (The Croatian Academy of Sciences and Arts), Department of Biotechnology (University of Rijeka) and Hrvatski liječnički zbor – podružnica Rijeka; July 4, 2016. (<http://symposium-neuroimmunology.uniri.hr>)
4. XVII. simpozij "Comprehensive approach to personalized medicine". Department of Clinical and Transplantation Immunology and Molecular Medicine in Rijeka (The Croatian Academy of Sciences and Arts), and University of Rijeka (Department of Biotechnology, Faculty of Medicine and Faculty of Law), November 10-11, 2016. ([http://www.biotech.uniri.hr/files/17\\_symposium\\_-\\_final.pdf](http://www.biotech.uniri.hr/files/17_symposium_-_final.pdf))
5. First NFFA Europe Science workshop: "Your gateway to nanoscience: open-access research at NFFA-Europe Facilities" March 27-28, 2017. Trieste, Italy. (<http://workshop2017.nffa.eu>)

#### Projects

**2019-2021:** UNIRI projects 2018 (uniri-prirod-18-290) entitled "Identification and quantification of neural stem cells with the new method of optimized homogenization"  
**2019-2021:** collaborator on UNIRI projects 2018 (uniri-biomed-18-258) entitled "Identification of key molecules controlling Heat Shock Proteins-mediated neuroprotection and neuroregeneration after in vitro opossum spinal cord injury"  
**2018:** Support of the University of Rijeka for young researchers n.18.12.2.1.01  
**2018-2022:** collaborator on Croatia Science Foundation (HRZZ) project n. IP-01-2018 "Controlling neurodegeneration by modulating the crosstalk between inflammation and proteinopathy"  
**2017:** Nanoscience foundries & fine analysis (NFFA), proposal ID321 ([www.nffa.eu](http://www.nffa.eu))  
**2017:** collaborator on Croatia Science Foundation (HRZZ) project n. IP-2016-06-7060 "Exploring the borderland between neurodegeneration and neuroregeneration: identification of key molecules with proteomics and functional assays in the mammalian spinal cord"  
**2013-2016:** collaborator on EU Contr. 604263 (NEUROSCAFFOLDS – in coordination with China) "Rapid Prototyping Scaffolds for the Nervous System"; [www.neuroscaffolds.eu](http://www.neuroscaffolds.eu)  
**2008-2011:** collaborator on EU Contr. 214566 (NANOSCALE) "Understanding interactions between cells and nanopatterned surfaces"; [www.nanoscale-fp7.eu](http://www.nanoscale-fp7.eu)

#### Invited lectures

23.5.2018. University of Trieste, Faculty of Medicine, invited lecturer for the course "Corso di base sulla sperimentazione animale: il benessere dell'animale da laboratorio". Lecture title: "*Monodelphis domestica* (opossum), un valido modello animale per lo studio della rigenerazione del sistema nervoso centrale"  
<http://www2.units.it/opba/Corso%20OPBA-MBPE%202018/LOCANDINA%20corso%20OPBA-MBPE%202018.pdf>

#### Memberships

**2012-2013** Biophysical Society

#### Honours and awards

**2013:** the image of the article by Migliorini E, Ban J. et al was selected as a cover of the Vol.110 N.8 of *Biotechnology and Bioengineering* (<http://onlinelibrary.wiley.com/doi/10.1002/bit.24680/full>)