Dr. V.V.G. Krishna Inavalli (Veera Venkata Gopala Krishna Inavalli)

Interdisciplinary Institute for Neurosciences (IINS)
University of Bordeaux – CNRS UMR 5297
146, rue Leo Saignat, 33077 Bordeaux, FRANCE
Tel: +33 (0)782576078
Email: gopala-krishna.inavalli@u-bordeaux.fr

Gender: Male
Nationality: Indian

EDUCATION

2007/2012 **Doctorate in Physics,** Optics
Thesis title: *"Optical vector-vortex beams: Generation, Characterization and Applications"*
Beam Optics and Applications Group (BOAG) – University of Hyderabad, India

2004/2006 **Masters in Physics**, specialization in Spectroscopy
Andhra University, Andhra Pradesh, India

1999/2002 **Bachelor of sciences,** specialization in Maths, Physics and Chemistry
Andhra University, Andhra Pradesh, India

RESEARCH EXPERIENCE

Present - 10/2014 **Post-doctorate** in the teams of Dr. Jean-Baptist Sibarita & Prof. Valentin Nägerl
Interdisciplinary Institute for Neurosciences (IINS) – University of Bordeaux - France
"Development of cutting-edge super-resolution microscopy techniques for cellular Neuroscience"

- *Developed a correlative super-resolution microscopy technique by combining single molecule localization microscopy (SMLM) with STED microscopy: to reveal nanoscale organization and dynamics of proteins with respect to the morphology*
- *Developed a SUper-resolution SHadow Imaging (SUSHI) microscopy technique: To reveal the dynamics and organization of extracellular space in living brain tissue*
- *Developed 3D STED microscopy with spatial light modulators: to study structural basis of astrocytic calcium signals at tripartite synapses*
- *Optimized 2photon-STED microscope for chronic in-vivo imaging: to image dendritic spines turnover in the hippocampus*
- *Implemented a 3D single molecule localization microscopy: to access 3D organization of memberin proteins*
- *Implemented 3D correlative SMLM/STED microscopy: to access 3D organization of proteins with respect to morphology*

07/2014 - 04/2013 **Post-doctorate** in the team of Prof. Toussaint C. Kimani
PROBE lab – University of Illinois at Urbana Champaign (UIUC), USA
"Development of microscopy techniques and complex wavefront shaping"

- *Developed a real-time Quantitative Second Harmonic Generation technique: to probe the real-time changes in the dynamic systems*
- *Developed a holographic microscopy: to imprint desired images onto the plasmonic Nano films*
- *Worked on the Complex wavefront shaping techniques: to optimize intensity, phase and polarization of scattered light*

10/2012 - 07/2007 **Doctorate** in the team of Prof. Nirmal K Viswanathan
Beam Optics and Applications Group (BOA) – University of Hyderabad, India
"Optical vector-vortex beams: Generation, Characterization and Applications"

- *Proposed a new method to generate orbital angular momentum (OAM) and spatially varying polarization beams (vector-vortex) using a two-mode fiber*
- *Controllable switching between different VV beams*
- *Generation of isolated polarization singularities: C-point and S-line*
- *Demonstration of rotational Doppler effect due to polarization singularities*
- *Wavelength dependent polarization singularities in optical fiber*
- *Detailed study of scalar and vector singularities: analyzer rotation, polarization interferometry and complex Stokes parameter method to map polarization at each and every point of the beam cross section.*

TRAINING AND TEACHING ACTIVITY

Trainer for a prestigious **Cajal** school and Bordeaux Imaging Center (BIC) "Super-resolution microscopy workshop"

Designed biological experiments and trained participants in imaging and data analysis, also taught super-resolution microscopy basics.

06/2019	*BIC-Super-resolution microscopy workshop*, Bordeaux
09/2018	**Cajal school** - *Advanced imaging methods for cellular neuroscience*, Bordeaux
05/2018	*BIC-Super-resolution microscopy workshop*, Bordeaux
10/2017	**Cajal school** - *Connectomics: from micro to meso and macro-scale*, Bordeaux
06/2017	**Cajal school** - *Advanced Techniques for Synapse Biology,* Bordeaux
05/2017	*BIC-Super-resolution microscopy workshop*, Bordeaux

Teaching assistance during PhD

Helped to establish Optics, Laser and Modern physics labs. Trained students and conducted exams. And also, helped students to solve their assignments.

01-04/2012	M.Sc *"Modern physics lab"* with Prof. Ganasham Krishna
07-11/2011	M.Sc *"Laser physics lab"* with Prof. Narayana rao
01-04/2011	M.Sc *"Modern physics lab"* with Prof. Ganasham Krishna
07-11/2010	M.Tech *"Advanced Mathematical methods"* with Prof. Chaturvedi
01-04/2010	I.M.Sc "*Ray optics lab"* for optometry and vision students, I build the complete lab
07-11/2009	M.Tech *"Advanced Mathematical methods"* with Prof. Chaturvedi
01-04/2009	I.M.Sc *"Waves and oscillations lab"* with Prof. Nirmal K Viswanathan
07-11/2008	M.Sc *"Laser physics lab"* with Prof. Narayan Rao & Prof. Nirmal K Viswanathan
01-04/2008	I.M.Sc "*Waves and oscillations lab*" with Prof. Nirmal K Viswanathan

SUPERVISION ACTIVITY

2017/2018	Co-supervision of a Master student (1 year), IINS, Bordeaux "*Investigating the morphological and biophysical properties of perineuronal nets using Super-Resolution Shadow Imaging (SUSHI) in living brain slices"*
04-05/2017	Co-supervision of a Master student (2 months), IINS, Bordeaux "*Characterization and performance test of a novel tip-tilt scanner for STED super-resolution microscopy"*
01-05/2012	Co-supervision of a Master student (5 months), University of Hyderabad, India *"Effect of dove prism on polarized Gaussian light beam"*
2011/2012	Co-supervision of an Integrated Master student (1 year), University of Hyderabad, *"Wavelength dependence of polarization effects in singular beams generated using a two-mode fiber"*

SCHOOLS AND WORKSHOPS ATTENDED

2019	*EMBO workshop on "Cell biology of the neuron: Polarity, plasticity and regeneration," Heraklion, Grace, 7-10 May, 2019*
2013	*OSA incubator meeting on "Controlled light propagation through complex media", Washington, DC, USA, March 5-7, 2013*
2011	*Work shop on "Singular Optics and its Applications," ICTP, Italy, 30 may - 3 June,2011*
2010	*Kumari L.A. Meera memorial workshop on "Frontiers in Optics"" Bangalore, December 5-15, 2008.*

COLLECTIVE RECOGNITIONS, AFFILIATIONS AND RESPONSIBILITIES

2011	*PhD Fellowship from Center for Advanced Science (CAS), India*
2011	*Travel grant from Department of Science and Technology (DST), India*
2012	*Member of Optical Society of America (OSA)*
From 2013	***Reviewer** for international peer-reviewed journals* *Photonics Research, Optics Letters, Applied Optics, Optics Express, Scientific Reports, Journal of Optical Society of America, Journal of Microscopy*

PUBLICATIONS

Publications in international peer-reviewed journals

1. Misa Arizono, **V.V.G. Krishna Inavalli**, Mirelle Ter Veer, Thomas Pfeiffer, Aude Panatier, Julie Angibaud, Jillian Stobart, Luigi Bellocchio, Giovanni Marsicano, Katsuhiko Mikoshiba, Stéphane H.R. Oliet, Bruno Weber, U. Valentin Nägerl "Structural basis of astrocytic Ca^{2+} signals at tripartite synapses" **Nature Communication**, 11, 1906 (2020) **IF: 12**
2. Bettina Stolp*, Flavian Thelen*, Xenia Ficht*, Lukas M. Altenburger, Nora Ruef, **V.V.G. Krishna Inavalli,** Philipp Germann, Nicolas Page, Federica Moalli, Andrea Raimondi, Kirsten A. Keyser, S. Morteza Seyed Jafari, Francesca Barone, Matthias S. Dettmer, Doron Merkler, Matteo Iannacone, James Sharpe, Valentin Nagerl, Christoph Schlapbach, Oliver T. Fackler, Jens V. Stein, "Salivary gland macrophages assist tissue-resident CD8+ T cell immune surveillance" **Science Immunology**, 5, 46 (2020) **IF: 11**
3. **V.V.G. Krishna Inavalli,** Martin Lenz, Corey Butler, Julie Angibaud, Eric Hosy, Benjamin Compans, Florian Levet, Jan Tonnesen, Olivier Rossier, Gregory Giannone, Olivier Thoumine, Daniel Choquet, Jean-Baptiste Sibarita*, U. Valentin Nägerl*, * equal contribution "A super-resolution platform for correlative live single molecule imaging and STED" **Nature Methods**, 16, 1263-1268 (2019) **IF: 28**
4. Jan Tonnesen, **V.V.G. Krishna Inavalli** and Valentin Nägerl "Super resolution imaging of the extracellular space in the living brain tissue" **Cell**, 172, 1108-1121 (2018) **IF: 36**
5. Thomas Pfeiffer*, Stefanie Poll*, Stephane Bancelin*, Julie Angibaud, **V.V.G. Krishna Inavalli**, Kevin Keppler, Martin Fuhmann and U. Valentin Nägerl, * equal contribution "Chronic 2P-STED imaging reveals high turnover of dendritic spines in the hippocampus in vivo" **Elife**, 7, e34700 (2018) **IF: 8**
6. Brain J Roxworthy, Abdul M Bhuiya, **V.V.G. Krishna Inavalli**, Hao Chen and Kimani C Toussaint Jr "Multifunctional plasmonic film for recording near-field optical intensity" **Nano Letters**, 8, 4687- 4693 (2014) **IF: 12**
7. Mohammad M. Kabir, **V.V.G. Krishna Inavalli**, Tung-Yuen Lau, and Kimani C Toussaint Jr "Application of quantitative second–harmonic generation microscopy to dynamic conditions" **Biomedical Optics Express**, 4, 2546-2554 (2013). **IF: 4**
8. Vijay Kumar, **V.V.G. Krishna Inavalli** and Nirmal K. Viswanathan "Dynamic evolution of transverse energy flow in focused asymmetric optical vector-vortex beams" **Optics Communication,** 285, 4866-77 (2012) **IF: 2**
9. **V.V.G. Krishna Inavalli** and Nirmal K. Viswanathan "Rotational Doppler-effect due to selective excitation of vector-vortex field in optical fiber" **Optics Express**, 19, 448-457 (2011) **IF:3.5**
10. **V.V.G. Krishna Inavalli**, P. Vijay and Nirmal K. Viswanathan "Wavelength dependence of the

polarization singularities in a two-mode optical fiber" **International Journal of Optics,** 2012, 358093 (2011) **IF: 1**

11. Y.V. Jayasurya, **V.V.G. Krishna Inavalli** and Nirmal K. Viswanathan "Polarization singularities in the two-mode optical fiber output" **Applied Optics**, 50, E131-E137 (2011) **IF: 2**
12. **V.V.G. Krishna Inavalli** and Nirmal K. Viswanathan "Switchable vector vortex beam generation using an optical fiber" **Optics Communication**, 283, 861-864 (2010) **IF: 2**
13. Nirmal K. Viswanathan and **V.V.G. Krishna Inavalli** "Generation of optical vector beams using a two-mode optical fiber" **Optics Letters**, 34, 1189 -1191 (2009) **IF: 3.5**

CONFERENCE PRESENTATIONS

Invited Presentations

1) **V.V.G. Krishna Inavalli**
"A super-resolution platform for correlative live 3D single molecule imaging and STED microscopy" BIC Super resolution microscopy workshop, June 4th to 7th (2019), Bordeaux
2) **V.V.G. Krishna Inavalli**
"Super- resolution microscopy in neurobiology: a method that has come of age", Synapse day, 30th March (2018), Bordeaux
3) **V.V.G. Krishna Inavalli**
"A super-resolution platform for correlative single molecule imaging and STED microscopy" BIC Super resolution microscopy workshop, May 29th to 31 (2018), Bordeaux
4) **V.V.G. Krishna Inavalli**
"Combining single molecule imaging with STED microscopy to reveal the dynamic molecular organization of synaptic proteins and structure" BIC Super resolution microscopy workshop, May 30th to Jun 1st (2017), Bordeaux
5) **V.V.G. Krishna Inavalli**
"Singularities in wave optics" OSA Student-Interaction meeting, Jun 12th (2012), Hyderabad, India

Oral Presentations

6) **V.V.G. Krishna Inavalli,** Martin Lenz, Corey Butler, Julie Angibaud, Eric Hosy, Benjamin Compans, Florian Levet, Jan Tonnesen, Olivier Rossier, Gregory Giannone, Olivier Thoumine, Daniel Choquet, Jean-Baptiste Sibarita, U. Valentin Nägerl "Deciphering the morphology of synapses with their molecular organization and dynamics by combining STED and single molecule microscopy" Frontiers in Neurophotonics Symposium (FINS), October 15-18 (2017), Bordeaux
7) **V.V.G. Krishna Inavalli**, Martin Lenz, Corey Butler, Julie Angibaud, Eric Hosy, Benjamin Compans, Florian Levet, Jan Tonnesen, Olivier Rossier, Gregory Giannone, Olivier Thoumine, Daniel Choquet, Jean-Baptiste Sibarita, U. Valentin Nägerl "The morphology of synapses with their dynamic molecular organization revealed by STED microscopy combined with single-molecule imaging", France Bio imaging (FBI) 4th annual meeting, April 14 (2017), Paris
8) **V.V.G. Krishna Inavalli,** Martin Lenz, Corey Butler, Julie Angibaud, Eric Hosy, Benjamin Compans, Florian Levet, Jan Tonnesen, Olivier Rossier, Gregory Giannone, Olivier Thoumine, Daniel Choquet, Jean-Baptiste Sibarita, U. Valentin Nägerl "Combining STED microscopy with single-molecule imaging to reveal the morphology of synapses and their dynamic molecular organization" Focus on Microscopy (FOM), April 9-12 (2017), Bordeaux
9) Jan Tonnesen, **V.V.G. Krishna Inavalli** and Valentin Nägerl "Super-resolution imaging of the interstitial fluid to reveal the nano-anatomical organization of live brain tissue" Focus on Microscopy (FOM), April 9-12 (2017), Bordeaux
10) Tung-Yuen Lau, Mohammad M. Kabir, **V.V.G. Krishna Inavalli**, and Kimani C. Toussaint "Real-time Fourier Transform-Second-Harmonic Generation Imaging of Collagen-based Biological Tissues" Quantitative Medical Imaging, June 23-27, Arlington, Virginia, USA
11) N.K. Viswanathan and **V.V.G. Krishna Inavalli** "Rotational frequency shift in cylindrical vector beams due to skew rays in few-mode optical fibers" Proc. SPIE 7613, 761307-9 (2010)

Poster Presentations

12) Lotte Razenberg, Misa Arizono, **V.V.G. Krishna Inavalli**, Julie Angibaud and U. Valentin Näger "Super-resolution imaging of functional nano-architecture in astrocytes" Dutch Neuroscience Meeting, 21 Jun (2019), Lunteren, Netherlands
13) **V.V.G. Krishna Inavalli**, M. O. Lenz, C. Butler, J. Angibaud, B. Compans, F. Levet, J. Tønnesen, O. Rossier, G. Giannone, O. Thoumine, E. Hosy, D. Choquet, J.B. Sibarita, and U. V. Nägerl "A super-resolution platform for correlative single-molecule imaging and STED microscopy" EMBO workshop on Cell biology of the neuron: Polarity, plasticity and regeneration, May 7-10 (2019), Heraklion, Grace
14) Misa Arizono, **V.V.G. Krishna Inavalli**, Mirelle ter Veer, Thomas Pfeiffer, Aude Panatier, Julie Angibaud, Jillian Stobart,Luigi Bellocchio, Giovanni Marsicano, Katsuhiko Mikoshiba, Bruno Weber, Stéphane H.R. Oliet, and U. Valentin Nägerl "Structural basis of astrocytic Ca^{2+} signals at tripartite synapses" EMBO workshop on Cell biology of the neuron: Polarity, plasticity and regeneration, May 7-10 (2019), Heraklion, Grace
15) Agata Idziak, Misa Arizono, **V.V.G. Krishna Inavalli**, and U. Valentin Nägerl "Super-resolution imaging of brain tissue during chemical fixation" EMBO workshop on Cell biology of the neuron: Polarity, plasticity and regeneration, May 7-10 (2019), Heraklion, Grace
16) Jan Tonnesen, **V.V.G. Krishna Inavalli** and Valentin Nägerl "Super-resolution imaging of the interstitial fluid to reveal the nano-anatomical organization of live brain tissue" NeuroFrance, May 17-19 (2017), Bordeaux, France
17) Jan Tonnesen, **V.V.G. Krishna Inavalli** and Valentin Nägerl "Super-resolution imaging of the extracellular space" SfN, Advancing the Understanding of the Brain and Nervous System, November 12-16 (2016), San Diego, USA
18) Vijay Kumar, **V.V.G. Krishna Inavalli** and N. K. Viswanathan "Wavelength dependent spin-orbit interaction in optical fibers**"** International workshop on spin-orbit interaction for light and matter waves, April 15 -19th (2013), MPIPKS Dresden, Germany
19) **V.V.G. Krishna Inavalli**, P. Vijay and N.K. Viswanathan "Polarization singularities due to cyclic changes in the vector modes of a two-modes of a two-mode fiber**,"** Work shop on Singular Optics and its Applications to Modern Physics, 30th May-3rd Jun (2011), ICTP-Italy
20) **V.V.G. Krishna Inavalli**, Y.V. Jayasurya and N.K. Viswanathan "Measurement of polarization singularities in the output of two-mode optical fiber," Photonics, December 11-15 (2010), Guwahati, India
21) **V.V.G. Krishna Inavalli** and N.K. Viswanathan "Measurement of angular Doppler effect of rotating light beam," India-Singapore Joint Physics Symposium (2010), Hyderabad, India
22) **V.V.G. Krishna Inavalli** and N.K. Viswanathan "Generation of switchable vector beams with two-mode optical fiber and its characteristics," International Conference on Optics and Photonics (ICOP), 30th October – 1st November (2009), Chandigarh, India,
23) Maruthi M. Brundavanam, **V.V.G. Krishna Inavalli** and Nirmal K Viswanathan "Optical line singularity due to modal interference in tip-modified two mode optical fiber" Photonics, Delhi, India, December 13 -17 (2008)

REFERENCES

Prof. Jean-Baptiste Sibarita
Quantitative imaging of the cell group
Interdisciplinary Institute of Neurosciences
UMR 5297, 146 rue Léo Saignat
Centre Broca Nouvelle-Aquitaine
33076 Bordeaux, FRANCE
Tel: +33 557575606
Email: jean-baptiste.sibarita@u-bordeaux.fr

Prof. Valentin Nagerl
Synaptic Plasticity and Super-Resolution microscopy
Interdisciplinary Institute of Neurosciences
UMR 5297, 146 rue Léo Saignat
Centre Broca Nouvelle-Aquitaine
33076 Bordeaux, FRANCE
Tel: +33 533514707
Email: valentin.nagerl@u-bordeaux.fr

Prof. Kimani C. Toussaint
Prob Lab
Brown University
Barus and Holley 255
Providence, RI 02912, USA
Tel: (401) 863-1997
Email: kimani_toussaint@brown.edu

Prof. Nirmal K Viswanathan
School of Physics
University of Hyderabad
Hyderabad – 500046, India
Tel:(+)91-40-23134337
Email: nirmalsp@uohyd.ac.in