

## VINOSHENE PILLAI RAJAN

+

### EDUCATION

Scuola Normale Superiore, Pisa 2015-Present

PhD in Biophysical Sciences

Specialization: Intravital Two-photon Imaging of Glioblastoma Mouse Models

National University of Malaysia, KL & National Science University of Malaysia, PNG 2011-2015

Masters in Organic Chemistry

Specialization: Isolation, characterization and pharmaceutical properties of secondary metabolites from lichens

National University of Malaysia, KL 2009-2011

Bachelor's Degree in Chemistry

### CURRENT RESEARCH ACTIVITY

#### Main Project:

- Studying the tumor growth and invasion of peritumoral tissues of fluorescent glioblastoma mouse models
  1. Morphology and invasion of glioma cells along collagen fibers
  2. Short time-lapse to see the micromovements of protrusions and blebbing
  3. Long time-lapse to monitor the speed of cells at different areas
  4. Glioma cells (GL261) expressing GCaMP6S and LifeAct-mDsRed2 for calcium imaging and structural imaging
  5. Wide field imaging for global calcium observations of the tumor
  6. Multimodal imaging and spectroscopy technique using Two photon microscopy and Raman spectroscopy to better understand the molecular fingerprints of glioma
- Exploiting an inducible model of glioblastoma
  1. Introducing an oncogene (HRasV12) coupled with fluorescent reporters via in-utero electroporation technique.
  2. Observing coordinated migration of tumor cells and the formation of cell streams.
  3. Studying the correlation between tumor cell morphology and calcium activity to understand the role of intracellular signalling in tumor metastases.

#### Other Project:

- Circadian rhythm and intracellular chloride concentration in neurons
  1. Electrophysiological analysis of circadian sleep at different times of the day and correlating the recording pattern with different cellular chloride concentration throughout the day
  2. Chloride concentrations are regulated by two different cotransporters NKCC1 and KCC2, therefore recordings are also done by blocking one of these two cotransporters and measuring the circadian recordings

### RESEARCH INTEREST

- To understand the invasion pattern of glioblastoma into brain tissues and the role of calcium activity in migrational potential in tumor cells.
- Understanding and analysing calcium signalling of mutant cells and wild type cells in-vitro and in-vivo

- To identify and characterize the molecular fingerprint of glioma using multimodal spectroscopy
- To understand the relationship between circadian clock and intracellular chloride concentration

## **PROFESSIONAL TRAINING**

### **Workshop**

1. 2nd Nic@Iit Nanoscopy 2.0 Practical Workshop on Advanced Microscopy 1-4 December 2015- Nikon Imaging Center, Intitute of Istituto Italiano di Tecnologia, Genoa, Italy.
2. Euro BioHighTech, Smart Health: Research for Business Innovation, Stazione Marittima di Trieste, Italy, 26-27 Settembre 2018

### **Spring School**

International School of Biophysics «Antonio Borsellino» 43rd Course: Nanoscale biophysics: Focus on Methods and Techniques (Directors: A. Diaspro - P.Bianchini) - Erice, Sicily, Italy, 17-24 April 2016.

### **Seminars**

1. The phasor analysis applied to fluorescence lifetime imaging of environmental probes: biophysical and technological applications (Antonella Battisti -NEST, NANO CNR) 17<sup>th</sup> November 2016
2. Neuroscience Seminar- Cell cycle control of glioblastoma cancer stem cells by CLIC1 protein functional expression in the plasma membrane (Michele Mazzanti-CNR) 20<sup>th</sup> April 2017
3. Why are cortical networks prone to seizures? (Andy Trevelyan, Newcastle University, UK), NEST Scuola Normale Superiore, 27<sup>th</sup> October 2017

### **Advance Courses**

1. Sleep and Cognition- Neuroscience School of Advanced Studies @Certosa di Pontignano, Siena, Italy, 8-15<sup>th</sup> July 2017
2. Molecular Stratagem of Glioblastoma- Neuroscience School of Advanced Studies @San Servolo, Venice, Italy, 5-12<sup>th</sup> May 2018

## **AWARD**

1. International Conference on Antioxidants and Degenerative Diseases – ICADD, 3-4 June 2015, Kuala Lumpur, Malaysia– Poster Presentation (Best Poster Award).

## **PRESENTATIONS**

### **Colloquium**

1. Universiti Kebangsaan Malaysia, Faculty of Science and Technology 2015 Postgraduate Colloquium. 15–16 April 2015.

### **Conference**

1. International Conference on Antioxidants and Degenerative Diseases – ICADD, 3-4 June 2015, Kuala Lumpur, Malaysia– Poster Presentation (Best Poster Award).
2. "Stem Cells and Cancer" Gordon Research Conference, 24-29 March 2019, Ventura Beach Marriot, Ventura, California – Poster Presentation.

### **Outreach Activities**

1. Researchers Night- BRIGHT Pisa, Poster Presentation, Logge dei Banchi, CNR, Pisa, Italy, 29 September 2017
2. Researchers Night- BRIGHT Pisa, Poster Presentation, Brogo Stretto, Pisa, Italy, 5 October 2018
3. Nanomeeting 2018, Sala Azzura- Scuola Normale Superiore, Pisa, Italy, 29 October 2018
4. NEST Congress- Highlights in Nanoscience, Aulla Dini, Scuola Normale Superiore, Pisa, Italy, 10 & 11 June 2019

5. Institute of Neuroscience Annual Retreat 2019- Poster Presentation, Consiglio Nazionale delle Ricerche, Pisa, Italy, 2<sup>nd</sup>-4<sup>th</sup> October 2019
6. Institute of Neuroscience Virtual Retreat 2020- Oral Presentation, Consiglio Nazionale delle Ricerche, Pisa, Italy, 30<sup>th</sup> November 2020

## PUBLICATIONS

1. Trovato, F., Parra, R., Pracucci, E., Landi, S., Cozzolino, O., Nardi, G., Cruciani, F., **Pillai, V.**, Mosti, L., Cwetsch, A. W., Cancedda, L., Gritti, L., Sala, C., VerPELLI, C., Maset, A., Lodovichi, C., Ratto, G. M. (2020). *Modelling genetic mosaicism of neurodevelopmental disorders in vivo by a Cre-amplifying fluorescent reporter*. Nature Communications, 11, 6194 .
2. Baria, E., Praccuci, E., **Pillai, V.**, Pavone, F. S., Ratto, G. M., Cicchi, R. (2020). *In vivo detection of murine glioblastoma through Raman and reflectance fibre-probe spectroscopies*. Neurophotonics, 7(4), 045010.
3. **Rajan, V. P.**, Gunasekaran, S., Ramanathan, S., Murugaiyah, V., Samsudin, M.W., Din, L.B. (2016). Biological activity of four Parmotrema species of Malaysian origin and their chemical constituents. Journal of Applied Pharmaceutical Science, Vol. 6(08), pp 036-043.
4. Gunasekaran, S., **Pillai Rajan, V.**, Ramanathan, S., Murugaiyah, V., Samsudin, M.W., Din, L.B. (2016). Antibacterial and antioxidant activity of lichens *Usnea rubroincta*, *Ramalina dumeticola*, *Cladonia verticillata* and their chemical constituents. Malaysian Journal of Analytical Science, 20 (1), 1-13.

## CONFERENCE PROCEEDINGS

1. Baria, E., Praccuci, E., **Pillai, V.**, Pavone, F. S., Ratto, G. M., Cicchi, R. (2019). *In vivo multimodal fibre-probe spectroscopy for glioblastoma detection in mouse model*. Proc. SPIE 11073, Clinical and Preclinical Optical Diagnostics II, 11073N (19 July 2019)
2. **Pillai Rajan, V.**, Gunasekaran, S., Ramanathan, S., Murugaiyah, V., Samsudin, M.W., Din, L.B. (2015) Antibacterial activity of extracts of *Parmotrema praesorediosum*, *Parmotrema rampoddense*, *Parmotrema tinctorum* and *Parmotrema reticulatum*. AIP Conference Proceedings, 1678, 050015-1 - 050015-4 (2015); doi: 10.1063/1.4931294.
3. **Rajan, V. P.**, Gunasekaran, S., Ramanathan, S., Murugaiyah, V., Samsudin, M. W., Din, L. B. (2015). Antibacterial and Antioxidant Activities of Four *Parmotrema* species of Malaysian Origin and their Chemical Constituents. 1<sup>st</sup> International Conference on Antioxidants and Degenerative Diseases 3-4 June 2015, NP-04, page 74.