

PONTIFICIA ACADEMIA SCIENTIARVM

THE AWARD
OF THE
PIUS XI GOLD MEDAL
2018



PROF. NOBLE EPHRAIM BANADDA
PROF. DAVID M. SABATINI
PROF. MIRIAM SERENA VITIELLO

The aim of the Pontifical Academy of Sciences, which was founded on 28 October 1936 by the Holy Father Pius XI, is to honour pure science, wherever this may be found, to ensure its freedom, and to support the research essential for the progress of applied science.

On 28 October 1961, on the occasion of the 25th anniversary of the foundation of the Pontifical Academy of Sciences, the Holy Father John XXIII established the Pius XI Gold Medal in honour of the founder of the Academy. The medal should be awarded to a young scientist who has already gained an international reputation.

The Council of the Academy unanimously decided to award the “Pius XI Gold Medal” for the year 2018 to

PROF. NOBLE EPHRAIM BANADDA

PROF. DAVID M. SABATINI

PROF. MIRIAM SERENA VITIELLO

in recognition of their great merits as a scholars and the important contribution of their research to scientific progress.



NOBLE EPHRAIM BANADDA

DAVID M. SABATINI

MIRIAM SERENA VITIELLO



NOBLE EPHRAIM BANADDA, Ph.D.

Noble Banadda is a professor and the Chair of the Department of Agricultural and Biosystems Engineering, Makerere University (Uganda). Noble holds a Ph.D. in Chemical Engineering (2006) of the Katholieke Universiteit Leuven (Belgium). In 2007, Noble won the Cochran Fellowship to do postdoctoral studies in the Department of Chemical Engineering at Massachusetts Institute of Technology (USA).

OTHER APPOINTMENTS

- Adjunct Professor, Department of Agricultural and Biological Engineering, Iowa State University (USA)
- Senator, Makerere University, Kampala (Uganda)

AWARDS

- Next Einstein Fellow Laureate, Class of 2015-2016, March 2016
- Honored Young Scientist, Annual Meeting of New Champions 2015, World Economic Forum, Dalian, People's Republic of China, 9-11 September 2015

- President, National Young Academy, Uganda, 11 October 2015-Present
- Honored Young Scientist, Annual Meeting of New Champions 2014, World Economic Forum, Tianjin, People's Republic of China, 10-12 September 2014
- First Full Professor, Department of Agricultural and Bio-Systems Engineering, Makerere University, Uganda, August 2012-Present
- Prolific Author, The Inter-University Council for East Africa, August 2012

KEY PUBLICATIONS

Prosper Achaw Owusu, Noble Banadda, Ahmed Zziwa, Jeffrey Seay and Nicholas Kiggundu. Reverse engineering of plastic waste into useful fuel products. *Journal of Analytical and Applied Pyrolysis*, 130: 285-293, 2018. <https://doi.org/10.1016/j.jaap.2017.12.020>

S.G. Arhin, N. Banadda, A.J. Komakech and S.J. Marks. Pilot field-scale application of hybrid coagulation-ultrafiltration process for decentralized water treatment in low income settings: A case study in Kampala, Uganda. *Water Science and Technology: Water Supply*, ws2017159, 2017. In Press. DOI: 10.2166/ws.2017.159

Nora J. Sadik, Sital R. Uprety, Amina Nalweysio, Noble Banadda, Joanna Shisler, Patrick Degan and Thanh H. Nguyen. Quantification of multiple waterborne pathogens in drinking water, drainage channels, and surface water in Kampala, Uganda during seasonal variation. *Environmental Health Perspectives*, 1(6): 258-269, 2017

- D. Aboagye, Noble Banadda, R. Kambugu, J. Seay, N. Kiggundu, A. Zziwa and I. Kabenge. Glucose recovery from different corn stover fractions using dilute acid and alkaline pretreatment techniques. *Journal of Ecology and Environment*, 41:26-37, 2017
- D. Aboagye, N. Banadda and N. Kiggundu. A review on the potential of Ghana to convert orange peel fibres into bio-oil using fast pyrolysis. *Renewable and Sustainability Review Journal*, Vol. 70:814-821, 2017



DAVID M. SABATINI, M.D., Ph.D.

David Sabatini is Associate Director of the Whitehead Institute for Biomedical Research and Biology Professor at the Massachusetts Institute of Technology. He graduated from the Johns Hopkins University School of Medicine, after undergraduate studies in Biological Sciences at Brown University.

OTHER APPOINTMENTS

- Howard Hughes Medical Institute Investigator, 2008-present
- Broad Institute, Cambridge, MA Senior Associate Member, 2004-present
- Koch Institute for Integrative Cancer Research at MIT, Member, 2004-present

AWARDS

- Switzer Prize, 2018
- Dickson Prize in Medicine, 2017
- Lurie Prize in Biomedical Sciences, 2017
- National Academy of Sciences, Member, 2016
- National Academy of Sciences, Award in Molecular Biology, 2014

- Howard Hughes Medical Institute, HHMI Investigator, 2008

KEY PUBLICATIONS

- Twenty-five years of mTOR: Uncovering the link from nutrients to growth. Sabatini, DM. 2017. *Proc. Natl. Acad. Sci. U.S.A.* 114, 11818-11825. doi: 10.1073/pnas.1716173114 PMID:29078414
- Gene Essentiality Profiling Reveals Gene Networks and Synthetic Lethal Interactions with Oncogenic Ras. Wang, T, Yu, H, Hughes, NW, Liu, B, Kendirli, A, Klein, K, Chen, WW, Lander, ES, Sabatini, DM. 2017. *Cell* 168, 890-903.e15. doi: 10.1016/j.cell.2017.01.013 PMID:28162770
- Mechanism of arginine sensing by CASTOR1 upstream of mTORC1. Saxton, RA, Chantranupong, L, Knockenhauer, KE, Schwartz, TU, Sabatini, DM. 2016. *Nature* 536, 229-33. doi: 10.1038/nature19079 PMID:27487210
- Structural basis for leucine sensing by the Sestrin2-mTORC1 pathway. Saxton, RA, Knockenhauer, KE, Wolfson, RL, Chantranupong, L, Pacold, ME, Wang, T, Schwartz, TU, Sabatini, DM. 2016. *Science* 351, 53-8. doi: 10.1126/science.aad2087 PMID:26586190
- Sestrin2 is a leucine sensor for the mTORC1 pathway. Wolfson, RL, Chantranupong, L, Saxton, RA, Shen, K, Scaria, SM, Cantor, JR, Sabatini, DM. 2016. *Science* 351, 43-8. doi: 10.1126/science.aab2674 PMID:26449471



MIRIAM SERENA VITIELLO, Ph.D.

Miriam Serena Vitiello is the Director of Research at the Nanoscience Institute, National Research Council, Italy, and Contract Professor of Condensed Matter Physics at the Scuola Normale Superiore, Pisa. Miriam holds a Ph.D. in Physics from the University of Bari, where she also completed undergraduate studies.

OTHER APPOINTMENTS

- Advisory Board, Shanghai Institute of Microsystem and Information Technology, since 2016
- Agence Nationale de la Recherche (ANR, France), International evaluator of research projects, ANRAAP générique 2016 - CES24, since 2016

AWARDS

- 37° International Prize Guido Dorso – Research – Senate of the Italian Republic, 2016
- ERC Consolidator Grant 2015
- Early Career Achievement Award – SPIE International Society for Optics and Photonics 2015
- “Sergio Panizza” Optoelectronic and Photonic Award – Italian Physical Society 2012

- International Scientific Authors Award International Conference on Intersubband Transitions in Quantum Wells (USA)
- Young Scientist Award 2005, International Conference on Matter, Materials and Devices, Genova, Italy
- INFM Prize for Young Authors 2004

KEY RESEARCH ACHIEVEMENTS

Invention of THz wire lasers with record performances (*Nature Communications* 2018)

Invention of flexible THz saturable absorbers from liquid phase exfoliation of graphite (*Nature Communications* 2017)

Invention of the first THz near field probe for coherent phase/amplitude imaging with deeply sub-wavelength spatial resolution (*Nature – Scientific Reports* 2017)

Ultrafast optical switched for THz waves based on interface polaritons in black-phosphorus (*Nature Nanotechnology* 2017)

Invention of the first THz device exploiting van der Waals heterostr. (*Advanced Materials* 2016)

First experimental demonstration of an active photonic device exploiting topological insulator surface states (*Nano Letters* 2016); 3 invited talks

Invention of black phosphorus THz photodetectors (*Advanced Materials* 2015, *Scientific Reports* 2016); 7 invited talks

Demonstration of coherent perfect absorption of photons (*Nature Phys.* 2014)

Invention of quasi-crystal THz lasers (*Nature Communications* 2014); 6 invited talks

Printed by
The Pontifical Academy of Sciences
Casina Pio IV

Vatican City 2018