Shiju Abraham

Assistant Professor
Department of Physics
St. Pius X College Rajapuram,
Kasaragod, Kerala - 671532

Mob: +91 9645386064
E-Mail: shiju@post.bgu.ac.il

Academic Background

Post-Doctoral Research: Ben-Gurion University of the Negev, Israel (2017-2019)

Ph.D. Physics: Banaras Hindu University (2009-2016)

M.Sc. Physics: Annamalai University (2003-2005)

B.Sc. Physics: Kannur University (1999-2002)

Academic Honors and Awards

2017-2019: Post-Doctoral Fellow, *The Jacob Blaustein Institutes for Desert Research***,** BenGurion University of the Negev, Beer-Sheva, Sede Boqer Campus, Israel

2014: Prof. Sebastian Schlucker Group, *Faculty of Chemistry, University of Duisburg*, Essen, Germany, (June 01-30).
Alexander von Humboldt Research Group Linkage Program
(Isolated Au NPs/Graphene derivatives based SERS and GERS studies)

2013: Prof**. Klaus Von Klitzing (Nobel Laureate) and Prof. Jürgen Smet Group**,
Max Planck Institute of Solid State Research, Stuttgart, Germany, (July – September and November-December).
Max Planck Institute Funding
(Single Particle Photoluminescence, Mechanical Exfoliation of Graphene, CVD, Clean Room Experiments)

2012: **Prof. Arnulf Materny Group**, *School of Engineering and Science, Jacobs University*, Bremen, Germany, (June 10 - July 31 and Aug. 15 - Aug. 26, 2011).
Alexander von Humboldt Research Group Linkage Program
(Time-Resolved Spectroscopy)

2012: Prof. B. D. Malhotra Group, *National Physical Laboratory*, New Delhi, India,
(January 01 - January 15).
UGC-BHU Fellowship
(Electrochemistry and Biosensing)

2012: Prof. Jürgen Popp and Prof. Benjamin Dietzek Group, *Institute of Physical Chemistry, Friedrich-Schiller-University and Leibniz-Institute of Photonic Technology*, Jena, Germany, (May 05 - June 10 and August 01-20).

DFG Funded Project

(Photocatalytic Activity Studies on Graphene/TiO2 hybrid system)

2011: Prof. Jürgen Popp and Prof. Michael Schmitt Group, *Institute of Physical Chemistry, Friedrich-Schiller-University*, Jena, Germany, (June 10 - August 10).

DFG Funded Project

(Spectroscopic investigations of Nanomaterials)

2008: An All India Rank of 184 [Percentile 95.87] for Joint Entrance Screening Test [JEST] for Physics-2008

Academic / Teaching Experience

2015–2016 **Guest Lecturer (Physics and Electronics)**, *S.E.S. College*, Kannur University.

(Sept. 08, 2015-March 31, 2016)

2019- **Guest Lecturer (Physics)**, *St. Pius X College, Rajapuram*, Kannur University.

(June 24, 2019-Ocober 16, 2019)

2019- **Asst. Prof. (Physics)**, *St. Pius X College, Rajapuram*, Kannur University.

(October 17, 2019 onwards)

Post-Doctoral Research Experience:

Title: *(1) Nano fabrication of patterned surfaces; (2) Controlling the self-assembly of lipid bilayers; (3) Use AFM to study different surface 'fouling' mechanisms; (4) Defining the molecular forces and mechanical interactions between phages and bacteria*

Supervisors: **Dr. Yair Kaufman** and **Dr. Bar-Zeev Edo**

Description: (1) Fabricatiion of various SiO2/Si surfaces and study the self-assembly of lipid bilayers on this surfaces using potentiostat coupled atomic force microscopy. (2) Study the structural (topography) and mechanical (deformation, elasticity and stiffness) changes occurring in bacterial host **E. coli** following T4 infection in real-time using epifluorescence coupled atomic force microscope

Ph.D.

Title: *Investigations on Synthesis, Characterization and Applications of Carbon Nanostructures and their Metal/ Metal Oxide Composites*

Supervisor: **Prof. Anchal Srivastava**

Description: Synthesize of graphene and graphene derivatives (GO, RGO, GNRs, GQDs, GHs), silica nanoparticles, titanium dioxide nanoparticles, zinc oxide nanoparticles, gold nanoparticles and their composites for various applications; especially in biosensing, photo catalysis, photo-luminescence and for surface enhanced Raman spectroscopy (SERS)

Professional Affiliations

Reviewer of many international journals (Central European Journal of Chemistry, JPCC, etc)

Research and Teaching Interest

Surface Science, Surface Probe Microscopy, Materials Science, Electronics

Clean room experiments, E-Line lithography, Photolithography, Chemical vapor deposition, e-gun deposition, Profilometer, Ellipsometry, Wet and Dry Etching, AFM-Potentiostat (JPK), SEM, Raman spectroscopy (WITec), UV-vis spectrometer, PL spectrometer, FTIR spectrometer, Autolab Potentiostat/ Galvanostat

Journal Publications

International refereed journals (IF= Impact Factor)

1) **Shiju Abraham**, Tabea Heckenthaler, Yakov Morgenstern and Yair Kaufman. Effect of temperature on the structure, electrical resistivity, and charge capacitance of supported lipid bilayers. ***Langmuir***, 35: 8709-8715, 2019 **(IF-3.68)**
2) Karthik Rathinam, **Shiju Abraham (Equally Contributed)**, Yoram Oren, Dietmar Schwahn, Winfred Petry, Yair Kaufman and Roni Kasher. Surface-induced silica scaling during brackish water desalination: The role of surface charge and specific chemical groups. ***Environmental Science and Technology***, 53: 5202-5211, 2019 **(IF-7.15)**
3) Vijay K. Singh, Himanshu Mishra, Rashid Ali, Sima Umrao, Rajesh Srivastava, **Shiju Abraham**, Arvind Misra, Vidya Nand Singh, Hirdyesh Mishra, R.S.Tiwari and Anchal Srivastava. In situ functionalized fluorescent WS2-QDs as sensitive and selective probe for Fe3+ and a detailed study of its fluorescence quenching. ***ACS Applied Nano Materials***, 2: 566-576, 2019 **(IF-yet to announce)**
4) **Shiju Abraham**, Tabea Heckenthaler, Dyuti Bandyopadhyay, Yakov Morgenstern and Yair Kaufman. Quantitative description of the vesicle fusion mechanism on solid surfaces and the role of cholesterol. ***Journal of Physical Chemistry C***, 122: 22985-22995, 2018 **(IF-4.31)**

5) **Shiju Abraham**, Matthias König, Sunil Srivastava, Vinod Kumar, Bernd Walkenfort and Anchal Srivastava. Carbon nanostructure (0-3 dimensional) supported isolated gold nanoparticles as an effective SERS substrate. ***Sensors and Actuators B. Chemical,*** 273: 455–465, 2018 **(IF-6.39)**

6) Ranjana Singh, Sunayana Kashyap, Suveen kumar, **Shiju Abraham**, Tejendra K. Gupta, Arvind M. Kayastha, Bansi D. Malhotra, Preeti Suman Saxena, Anchal Srivastava, Ranjan K.Singh. Excellent storage stability and sensitive detection of neurotoxin quinolinic acid. ***Biosensors and Bioelectronics***, 90: 224-229, 2017 **(IF- 9.52)**

7) Sunayana Kashyap, Vinod Kumar, **Shiju Abraham**, Sima Umrao, Siddharath Singh, Arpana Kamath, Rajala MS, Anchal Srivastava and Preeti S Saxena. Microwave reduced graphene oxide as effcient NIR photothermal agent. ***Austin Journal of Biosensors and Bioelectronics***, 3(1): 1026, 2017

8) **Shiju Abraham**, Matthias König, Shobhit Pandey, Sunil Srivastava, Bernd Walkenfort and Anchal Srivastava. Two dimensional carbon nanostructure supported isolated Au NPs as an efficient SERS substrate. ***Asian Journal of Physics***, 25: 121-126, 2016

9) **Shiju Abraham**, Saurabh Srivastava, Vinod Kumar, Shobhit Pandey, Pankaj Kumar Rastogi, Narsingh R Nirala, Sunayana Kashyap, Sunil Srivastava, Vidya Nand Singh, Vellaichamy Ganesan, P.S Saxena and Anchal Srivastava. Enhanced electrochemical biosensing efficiency of silica particles supported on partially reduced graphene oxide for sensitive detection of cholesterol. ***Journal of Electroanalytical Chemistry***, 757:65–72, 2015 **(IF- 3.2)**

10) **Shiju Abraham**, Narsingh R. Nirala, Shobhit Pandey, Monika Srivastava, Sunil Srivastava, Bernd Walkenfort and Anchal Srivastava. Functional graphene-gold nanoparticle hybrid system for enhanced electrochemical biosensing of free cholesterol. ***Analytical Methods***, 7:3993–4002, 2015 **(IF- 2.38)**

11) Narsingh R Nirala, **Shiju Abraham**, Vinod Kumar, Anushka Bansal, Anchal Srivastava and Preeti S Saxena. Colorimetric detection of cholesterol based on highly efficient peroxidase mimetic activity of graphene quantum dots. ***Sensors and Actuators B. Chemical***, 218: 42–50, 2015 **(IF-6.39)**

12) Narsingh R Nirala, **Shiju Abraham**, Vinod Kumar, Shobhit Pandey, Monika Srivastava, Sanjay K Srivastava, Vidyanand Singh, Arvind M Kayastha, Anchal Srivastava and Preeti S Saxena. Partially reduced graphene oxide-gold nanorods composite based bioelectrode of improved sensing performance**.** ***Talanta***, 144:745–754, 2015 **(IF-4.92)**

13) Saurabh Srivastava, **Shiju Abraham**, Chandan Singh, Md. Azahar Ali, Anchal Srivastava, Gajjala Sumana and Bansi D. Malhotra. Protein conjugated carboxylated gold@reduced graphene oxide for aflatoxin B1 detection. ***RSC Advances***, 5:5406–5414, 2015 **(IF-3.05)**

14) Sima Umrao and **Shiju Abraham (Equally Contributed)**, Frank Theil, Shobhit Pandey, Valerian Ciobota, P. K. Shukla, Caroline J. Rupp, Sudip Chakraborty, Rajeev Ahuja, Jurgen Popp, Benjamin Dietzek and Anchal Srivastava. A possible mechanism for the emergence of an additional band gap due to a Ti-O-C bond in the TiO2-graphene hybrid system for enhanced photodegradation of methylene blue under visible light. ***RSC Advances***, 4:59890–59901, 2014 **(IF-3.05)**

15) **Shiju Abraham**, Valerian Ciobota, Saurabh Srivastava, Sunil K. Srivastava, Rajesh K. Singh, Jan Dellith, B. D. Malhotra, Michael Schmitt, Jurgen Popp and Anchal Srivastava. Mesoporous silica particle embedded functional graphene oxide as an efficient platform for urea biosensing. ***Analytical Methods***, 6:6711–6720, 2014 **(IF-2.38)**

16) Vinod Kumar, Vimal Singh, Sima Umrao, Vyom Parashar, **Shiju Abraham**, Anand K. Singh, Gopal Nath, Preeti S. Saxena and Anchal Srivastava. Facile, rapid and upscaled synthesis of green luminescent functional graphene quantum dots for bioimaging. ***RSC Advances***, 4:21101–21107, 2014 **(IF-3.05**)

Conference papers

17) Manish K Singh, Pathik Kumbhakar, Anchal Srivastava, **Shiju Abraham** and Himanshu Mishra. Synthesis and characterization of nanostructured SnO2/graphene composite thin film: Highly sensitive uv-sensor. **conf. proc. ICOL-2014**, Dehradun,2014

18) Sima Umrao, **Shiju Abraham**, Anirban Sinhamahapatra and Anchal Srivastava. High quality, high density growth of carbon-nitrogen-nanotubes using pyridine as precursor. **UPMUL00600**, ISSN-2319-5827, 2012

Submitted/ under preparation

19) **Shiju Abraham**, Francois Perreault, Yair Kaufman, and Bar-Zeev Edo. Changes in nano-topography and biomechanical properties of E. coli cells during T4-phage infection. (to be submitted in ***Nature Microbiology***) **(IF-14.30**)

20) Nadine Siebdrath, Bertram Skibinski, **Shiju Abraham**, Robert Berger, Noa Stein, Zelichover, Yair Kaufman, André Lerch, Moshe Herzberg . Impact of pretreatment on RO membrane organic fouling: Adhesion properties and composition of tertiary wastewater effluents. (to be submitted in ***Journal of Membrane Science***) **(IF- 7.02**)

21) **Shiju Abraham**, Yair Kaufman, and Bar-Zeev Edo. Probing the mechanical properties and extracellular polymeric substances removal mechanism of bacterial biofilm by bacteriophages: An AFM-OCT based in situ approach. (work on progress**)**

22) Vimal Singh, Vijay Singh, **Shiju Abraham**, Debraj Gangopadhyay, Anchal Srivastava and Preeti S Saxena. Ultrasensitive detection of prostate cancer biomarker using SERS active silver islands platform. (work on progress)

References

Prof. Anchal Srivastava, Department of Physics, Institute of Science, Banaras Hindu University, Varanasi-221005, India
Ph. +91 9453203122
E-Mail: anchalbhu@gmail.com
Dr. Yair Kaufman, University of California Santa Barbara, BioEngineering Department, Santa Barbara, CA, USA
Ph. +1-805-3968642
E-Mail: yairkauf@icloud.com
Dr. Edo Bar-Zeev, The Zuckerberg Institute for Water Research, Jacob Blaustein Institutes for Desert Research, Ben-Gurion University of the Negev, Israel
Ph. +972 50 9007296
E-Mail: edobarzeev@gmail.com

Conferences, Seminars & Talks

International conferences (06); Workshops (04); National conferences (02); Invited talks (03);

Regional conferences (04); Symposium (01); Schools (02)