

# Curriculum Vitae

**Name: Dr. JAYDEEP BHATTACHARYA**

**Designation:** Assistant Professor

**Address:** School of Biotechnology, Jawaharlal Nehru University, New Delhi

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## Educational Qualifications:

Ph. D	University of Calcutta	2007	Biotechnology
M.Tech	Jadavpur University	2003	Biotechnology
M.Sc	University of Kalyani	2000	Biophysics
B. Sc	University of Calcutta	1998	Physics

## Research Experience:

Assistant Professor-July 2014 onwards, SBT, JNU

Scientist: Jan 2014-July 2014, Forschungszentrum Juelich, Germany

Guest Scientist: Jan 2012-Dec 2013 Forschungszentrum Juelich, Germany

Postdoctoral Fellow: Jan 2010-Dec 2011, Forschungszentrum Juelich, Germany

Alexander Von Humboldt Fellow: July, 2008— December, 2009; Institution of Complex systems-8, Forschungszentrum Juelich, Germany

## Awards:

1. Alexander Von Humboldt Fellowship from Federal Republic of Germany for post doctoral research.

2. DAAD fellowship for the Post doctoral research in Germany from Federal Republic of Germany.

## Research Guidance

Currently guiding **6 PhD students, 3 postdoctoral fellows** and **3 project students**.

Guided around **8 masters students**.

## Important and Selected Publications:

1. **Unfolding of hemoglobin variants-insights from urea gradient gel electrophoresis photon correlation spectroscopy and zeta potential measurements.**

**Jaydeep Bhattacharya**, Ranjita GhoshMoulick, Utpal Choudhuri, Prantar Chakrabarty, Pranab K. Bhattacharya, Prabir Lahiri, Bikas Chakraborti, Anjan Kr. Dasgupta\*, *Analytica Chimica Acta* 522 (2004) 207-214

2. **Interaction of Hemoglobin and Copper Nanoparticle: Implications in Hemoglobinopathy**

**Jaydeep Bhattacharya**, Utpal Choudhuri, Omprakash Siwach, Prasenjit Sen, Anjan K Dasgupta\* *Nanomedicine: nanotechnology, biology, and medicine* 2(3)(2006)191-199

3. **Gold Nano Particle Based Tool to Study Protein Conformational Variants: Implications in Hemoglobinopathy**

**Jaydeep Bhattacharya**, Sinu Jasrapuria, Tapan Sarkar, Ranjita GhoshMoulick, Anjan Kr. Dasgupta\* *Nanomedicine: nanotechnology, biology, and medicine* 3 (2007) 14-19.

4. **A Size Dependent folding Contour for Cytochrome-C**

Shibsekhar Roy, Santiswarup Singha, **Jaydeep Bhattacharya**, Ranjita GhoshMoulick and Anjan Kr Dasgupta\*, *Biophysical Chemistry* 119 (2006) 15-23.

5. **Role of Purinergic Receptors in Platelet-Nanoparticle Interactions**

Suryyani Deb, Mohor Chatterjee, **Jaydeep Bhattacharya**, Prabir Lahiri, Utpal Choudhuri, Sankar Pal Choudhuri, Saumitra Kar, Omprakash Siwach, Prasenjit Sen, Anjan.Kr.Dasgupta\* *Nanotoxicology*(2006) 1(2),93-103

6. **Compensatory Secondary Structure Alterations in Protein Glycation**

Ranjita GhoshMoulick, **Jaydeep Bhattacharya**, Soumen Basak, Anjan Kr. Dasgupta\* *Biochimica Biophysica Acta* 1774 (2) (2007) 233-42.

## 7. Protein seeding of Gold nanoparticles and Mechanism of Glycation Sensing

Ranjita GhoshMoulick, **Jaydeep Bhattacharya**, Chanchal K Mitra, Soumen Basak and Anjan Kr. Dasgupta\* ,  
*Nanomedicine: nanotechnology, biology, and medicine* 3 (2007) 208-14

## 8. In vitro studies on bactericidal efficacy of gold nanoparticles conjugated antibiotics

**Jaydeep Bhattacharya**, Biswarup Saha, Ananda Chakraborty, Anjan K. dasgupta,Parimal Karmakar\*  
*Nanoscale Res Lett* 2 (2007) 577-622

## 9. Thermal Hysteresis of Some Important Physical Properties of Nanoparticle

Tapan Sarkar, Shibsekhar Roy , **Jaydeep Bhattacharya**, Dhananjay Bhattacharya , Chanchal K Mitra, Anjan Kr Dasgupta\*

*Journal of Colloid Interface Sci*, (2008)327: 1. 224-232 Nov

## 10. In Vitro Structural and Functional Evaluation of Gold Nanoparticles Anti-Glycation Activity of Gold Nanoparticle.

Santiswarup Singha, **Jaydeep Bhattacharya**,Himadri Datta,Anjan Kr.Dasgupta  
*Nanomedicine: nanotechnology, biology, and medicine*,(2009) 5(1),21-29

## 11. Microfluidic anodization of aluminium films for the fabrication of nanoporous lipid bilayer support structures ,

**Jaydeep Bhattacharya**, Alexandre Kisner, Andreas Offenhäusser, Bernhard Wolfrum,  
*Beilstein Journal of Nanotechnology*, 2 (2011) 104-109

## 12. Studies on Co-Translational Import of Bacteriorhodopsin into Lipid Bilayer Systems; Axel Baumann ·

Alexandros Katranidis ·**Jaydeep Bhattacharya** · Jörg Fitter · Georg Bueldt;*Biophysical Journal* 01/2012; 102(3)

## 13. Fabrication and characterization of zeromode waveguides: optical nanostructures for single molecule fluorescence detection; Jaydeep Bhattacharya, Alexandros Katranidis, Matteo Gabba,GeorgBüldt, GregorPanaitov, Dirk Mayer,Andreas Offenhäusser, Jörg Fitter;

Proc. Int.. Conf. on ‘Emerging Materials and Processes (ICEMP-2014)’, CSIR-IMMT Bhubaneswar, Feb. (2014) ISBN:978-81-928552-1-9

## 14. Gold Nanoflowers as efficient Hot spots for Surface Enhanced Raman Scattering

Subhavna Juneja, Arun Singh Patel, Anirban Chakraborty, Pawan K. Kanaujia and G.Vijaya Prakash, **Jaydeep Bhattacharya**, <http://arxiv.org/abs/1604.02793>

## 15. Synthesis of Graphenized Au/ZnO Plasmonic Nanocomposites for Simultaneous Sunlight mediated Photo-catalysis and Anti-microbial Activity

Juneja, S., Madhavan, A. A., Ghosal, A., Moulick, R. G., & Bhattacharya, J. (2018)..  
*Journal of Hazardous Materials*.

### Manuscript Submitted:

1. Ashwathi Asha Madhavan, Subhavna Juneja, Ranjita Ghosh Moulick, Jaydeep Bhattacharya\*,  
**Synthesis of Gold Nanoparticles from non-proteinaceous fraction of in vitro glycated Hemoglobin A0- A plausible colorimetric tool to detect AGE Products- ACA-18-1100**
2. Arun Singh Patel, Subhavna Juneja, Pawan K. Kanaujia,Vikas Maurya, G. Vijaya Prakash, Anirban Chakraborti, and Jaydeep Bhattacharya\*, **Gold Nanoflowers as efficient hosts for SERS based sensing and Bio-Imaging- NANOSO\_2017\_3217**
3. Juneja, S., Madhavan, A. A., Ghosal, A. & Bhattacharya, J. \*  
**Facile Synthesis of Green Tea Stabilised Dendritic Silver Nanostructures for SERS Based Ultra-sensitive Detection of Biotic and Abiotic Contaminants**  
Submitted to *Journal of Hazardous Materials*

## BOOK CHAPTERS

1. Ghosal, A., Tiwari, S., Mishra, A., Vashist, A., Rawat, N. K., Ahmad, S., & Bhattacharya, J. (2017). **Design and Engineering of Nanogels**. In *Nanogels for Biomedical Applications* (pp. 9-28).
2. Ghosal, A., Vashist, A., Tiwari, S., Sharmin, E., Ahmad, S., & Bhattacharya, J. (2017). **Nanotechnology for Therapeutics**. In *Advances in Personalized Nanotherapeutics* (pp. 25-40). Springer, Cham.

## US Patent

### **1. Methods for the detection and diagnosis of malaria using an electrochemical sensor ;**

Publication number US8287719 B2

Publication type Grant

Application number US 12/750,304

Publication date **16 Oct 2012**

### **2. Detector for Chemical Compounds:**

Publication number US8951783 B2

Publication type Grant

Application number US 13/254,153

PCT number PCT/IB2010/002990

Publication date **10 Feb 2015**

## International patents:

### **1. Detector for Chemical Compounds:**

PCT number PCT/IB2010/002990

**Chinese patent application :** [CN102834717A,WO2011124945A1](#)

### **2. Title :A novel process for detecting human haemoglobin variants** Assignee – Jawaharlal Nehru University and Calcutta University

Inventors: Faculty :PrasenjitSen, Anjan K. Dasgupta Students : Om Parkash and Jaideep Bhattacharya PCT application number PCT/IN2007/000002

### **3. Title :A novel process for detecting human haemoglobin variants** Assignee – Jawaharlal Nehru University and Calcutta University Inventors: Faculty :PrasenjitSen, Anjan K. Dasgupta Students : Om Parkash and Jaideep Bhattacharya Malaysia National Phase application/ International Clasification C12Q1/68 Published on 26.02.2010

## Indian Patents filed

### **1. Nobel Metal Nanoparticle Specific Interactions in Closely Homologous Hemoglobin. 39/DEL/2006**

### **2. Assembly of nanoscale particles to micron scale and their potential to classify templates 188/KOL/2008**

### **3. A tetramer dimer equilibrium of HbA0 based new electrochemical sensor for malaria detection. 118/KOL/2010**

### **4. .Apparatus for optical detection of chemical compounds 394/KOL/2010**

5. Jaydeep Bhattacharya, Ranjita Ghosh Moulick, Ashwathi Asha Madhavan, Subhavna Juneja, **A Gold nanoparticle based colorimetric biosensor for the detection of Advanced Glycation End Products-** Patent Application Number- 201811014098 dated 12/04/2018

6. Jaydeep Bhattacharya, Ranjita Ghosh Moulick, Raj Kamal, Ashwathi Asha Madhavan, **A low cost point-of- care microfluidic device for DNA/RNA isolation, purification and amplification using Chip based**

**PCR/ RT- PCR for the development of optical, Electrochemical, magnetic and other biosensing applications-** Provisional Patent Application Number-201811004666 dated 7/02/2018

7. Jaydeep Bhattacharya, Rupesh Chaturvedi, Ajita Jindal. **Bio -Engineered mesoporous dialysis nano beads for specific removal of excess body toxins, water and ions from kidney failure patients.** Provisional Patent No: 201711020373 dated 10-06-2017

8. Jaydeep Bhattacharya, Sounik Sarkar, Roshni Thapa; **“ANTIBIOTIC DELIVERY SYSTEM”**  
Provisional Patent Patent Application No. 201811019105 dated 22-05-2018

## Financial support received

Project Title	Sanction amount	Person's Status	Starting year	Duration	Funding Agency
Development of Single-cell derived clonal spheroids as a tool for drug discovery in cancer research	594 lakhs	Co-investigator	2018	Five years	DST, India
Development of novel lipid and polymer based nano formulations for targeted delivery of antimalarial drugs	104 lakhs	Co-PI	2017	Three years	DBT, India
To Study the Genotoxic Effect and Differential Protein Expression Level in the Directly Irradiated Cell and Through Radiation Induced Bystander Effect in Presence and Absence of Gold Nano-particles of Different Size and Shape	6.5 lakhs	PI	2017	Three years	IUAC, New Delhi
Microfluidics embedded nanostructured MEA– A tool to study prognostic multi-biomarker signatures in prostate cancer	42 lakhs	PI	2016	Three years	SERB,DST, India
UGC startup Grant	6 lakhs	PI	2016	Two years	UGC, India
Label free detection multiple analytes on a single platform of nanostructured Micro electrode array for medical diagnosis	24 lakhs	PI	2014	five years	UPE-II,JNU India

## **Research Work done and future Interest**

My research during Ph.D includes the study of the folding properties of different hemoglobin variants, synthesis of the nanoparticles and their usage to identify different hemoglobinopathies, conjugation of nanoparticles with Antibiotic to increase the bacterial cell killing efficiency, usage of nanoparticle to prevent protein glycation and platelet aggregation etc.

After that, I started working at Forschungszentrum Juelich, as an **A.V.Humboldt Fellow** at the Institute of Complex systems-8, where I was engaged in construction of a biosensor based on Field effect transistor and integrated with microfluidic channel. I have constructed lipid bilayer on nanoporous alumina support fabricated inside the microfluidic channel for ATP synthesis and sensing. Though the anodized alumina are very fragile, the specially localized anodization of the aluminum results in nanoporous support that can withstand 10 mbar of pressure. In another work I have developed an electrochemical system that can provide detailed information of the multimeric protein structure at the time of unfolding. I have also designed an electronic chip to conduct the polymerase chain reaction inside a droplet on it.

In my latest work I worked in Institute of Complex Systems-5, FZ-Juelich in Prof. Georg Bueldt's group in the field of single molecule fluorescence microscopy. I have performed confocal microscopic studies of tethered biomolecules on the chemically modified planar glass surface. I have studied the folding of the nascent polypeptide chain during the translational process by *in vitro* protein synthesis at a single molecule level. Surface tethered fluorescent labelled ribosomes were used to study the folding and maturation of Green fluorescence protein. Nano apertures known as Zero-mode optical Waveguides were used to synthesize Green fluorescence protein inside the waveguides on the tethered ribosome using cell free transcription translation system. The images were acquired using confocal microscope attached to Micro Time 200 (PicoQuant). The images were further analyzed by self written Matlab Scripts and the kinetics of GFP synthesis and maturation of the protein was measured using Gaussian mask fitting algorithm. Co-localization studies of the two different fluorophores were done and FRET efficiencies were calculated.

I have my research interest in nanobiotechnology and bioelectronics. Specially to develop some optoelectronic biosensors using nanoparticles and biomolecules. In my recent work we have designed a nanoparticle base optical sensor to detect advanced glycosylated end products and I am working to develop a low cost electrochemical sensor for the same. I am engaged in fabrication of nanostructured electrode (nanopores, metallic nanopillars). Patterned nanoparticle using nanoimprint lithography and micro contact printing will also be used for the fabrication of nanostructured surfaces. Biosensors based on such nanostructures shows higher sensitivity and biocompatibility. They will be used for cell-chip communications, medical diagnostics and to monitor the cell-cell communications. I have received a fund where I am going to purchase a Device that can measure the signal from Microelectrode arrays.