

# **Dhermendra Kumar Tiwari (Ph.D.)**

**UGC-Asst. Professor (FRP) & Ramalingaswami fellow**

Department of Biotechnology, Goa University,

**Personal research and teaching database**

Researcher ID: <http://www.researcherid.com:80/rid/F-9028-2010>

Google scholar: <http://scholar.google.com/citations?user=Vq8bB4UAAAAJ&hl=en>

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*Address of correspondence:*

Department of Biotechnology, Goa University, Taleigao Plateau, Goa 403206, India.

*From Jan 2018 to till date*

## **CURRENT POSITION:**

**UGC-Asst. Professor and Ramalingaswami-DBT faculty**, Department of Biotechnology, Goa University, Taleigao Plateau, Goa 403206, India.

## **POSITION HELD in PAST:**

*From July 2017 to Jan 2018*

Ramanujan faculty fellow (SERB-DST), Centre for Human Genetics and Molecular Medicine, Central University of Punjab, Bathinda

*June 2015 to May 2017*

Research Fellow (RF), Mechanobiology Institute, National University of Singapore, <http://mbi.nus.edu.sg>  
(Worked on selective plane illumination microscopy (soSPIM) for 3D live super-resolution imaging)

*March 2012 to May 2015*

JSPS-Postdoctoral fellow, Laboratory of Biomolecular Science and Engineering, Osaka University, Japan  
<http://www.sanken.osaka-u.ac.jp/labs/bse/>  
(Worked on reversibly switchable fluorescent protein for low laser power nanoscopy of live cells and developed "KOHINOOR" a fastest switching RSFP, which is published in *Nature Methods*)

*April 2011 to Feb 2012*

Postdoctoral fellow, Hokkaido University, Japan <http://www.oia.hokudai.ac.jp>  
(I worked on development of nano-light source virus like particle (VLP) for fluorescent protein excitation.)

## **ACHIEVEMENTS/AWARDS/RESEARCH FUND**

- *Ramalingaswami Re-entry Faculty fellowship*, 2017, DBT, India.
- *Ramanujan Faculty fellowship*, 2017, DST, India.
- *UGC (FRP)-Assist. Professor*, 2017, UGC-Faculty Recharge Program-cycle IV.
- *JSPS-Postdoctoral fellowship-2014*, Japanese Society for Promotion of Science, Japan
- *Fast-track young scientist fellowship*, 2012, DST, India.
- *Summer school fellowship-2008*, Osaka University Japan (Jul 14, 2008 to Jul 25, 2008).
- *NET-JRF-2007* in Life Sciences, CSIR.
- *GATE-2005, 2006* in Life science.
- *JNU all India Ph.D. entrance exam 2006* for M. Phil/PhD

## ***Title of Ph.D. thesis***

In-vivo toxicity and breast cancer imaging study of herceptin conjugated Cd/Se quantum dots.

## ***Title of M. Phil Dissertation***

Potential of Zero-dimensional nanostructure as an antibacterial devises against *Escherichia coli* and *Bacillus subtilis*.

## **ACADEMIC QUALIFICATION**

Name of University	Location	Degree	Specialization	Grade	Completion
1. Jawaharlal Nehru Uni	New Delhi, India	Ph.D.	Nanobioimaging,	NA	2007-11
2. Jawaharlal Nehru Uni	New Delhi, India	M. Phil	Nanobioimaging,	1 <sup>st</sup>	2005-07
3. C. S. J. M. Univ.	Kanpur, India	M. Sc.	Microbiology	1 <sup>st</sup>	2002-04
4. C. S. J. M. Univ.	Kanpur, India	B. Sc.	Bot, Zoology, Chem	1 <sup>st</sup>	1999-02
5. U. P. Board	Allahabad, India	12 <sup>th</sup>	Science (Bio.)	1 <sup>st</sup>	1997-99

## **TEACHING EXPERIENCE**

1. Teaching M.Sc. General Biotech and MSc. student Marine Biotechnology 1<sup>st</sup> year students (from Jan 2018 to till date).

### Course teaching:

- a. Environmental Biotechnology
2. Taught M.Sc. Sem-I & Sem-III students of Bioinformatics, Molecular Medicine and Human Genetics Departments in Central University of Punjab, Bathinda. (July 2017-Jan 2018)

### Course teaching:

- a. Basic and Clinical Biochemistry
  - b. Aging, Longevity and Health (Molecular and clinical aspects)
3. Worked as *Lecturer (Ad hoc)* in Microbiology department, C.S.J.M. University Kanpur, India (Aug 2004 to May 2005).

## **KEY EXPERTIES:**

- 2-D, 3-D cell culture, animal, bacterial, epithelial, mechanchymal, primary cell culture.
- Molecular Biology tool, Sequencer, Recombinant-DNA, Protein engineering & expression, purification.
- Fluorescent, Superresolution, Confocal, Spinning-disk, TIRF, PALM, light-sheet microscopy imaging, Nanobiosensor development.
- 2D, 3D, high-resolution, super-resolution imaging, Image reconstruction, ImageJ (Fiji), Metamorph, NS-element, RapidSTORM, Thunder-STORM, Origin analysis.

## **RESEARCH ACHIEVEMENTS**

### **RESEARCH GRANT:**

1. Rs. 35 lakh, Title: Photodynamic therapy using virus-like-nanoparticle (VLNP) using BRET nano-photosensitizer for noninvasive, ***SERB, India (ongoing)***
2. Rs. 10 lakh, start-up research grant from UGC, for UGC-FRP position (**ongoing**)
3. Rs. 32 lakh research grant for Ramalingaswami faculty fellowship for the period 2018-2023 from DBT, India (**ongoing**)
4. USD 30000, Title: Development of photoswitchable protein based nanosensor for functional imaging of neural activity, Japan Society for Promotion of Science (JSPS), Japan grant) (**finished**)

### **INTERNATIONAL PATENTS**

Title: FLUORESCENT PROTEIN, Pub. number: WO/2015/037674. (Int. patent)

### **RESEARCH ARTICLES (IF: ~65)**

- *Dhermendra K Tiwari*; Y Arai; M Yamanaka; T. Matsuda, M. Agestsuma, M. Nakano and T Nagai, Fast positively photoswitchable fluorescent protein for ultra-low laser power RESOLFT nanoscopy. *Nature Methods* **12**, 515–518 (2015). (IF-32.07)
- B R Sahoo; M R Dikhit; G K Bhoi, Jitendra M; S K Lenka; P K Dubey; *Dhermendra K Tiwari*, Understanding the distinguishable structural and functional features in zebrafish TLR3 and TLR22, and their binding modes with fish dsRNA viruses: an exploratory structural model analysis, *Amino Acids*. 2015, 47(2): 381-400. (IF-3.6)
- *Dhermendra K Tiwari*, T Jin and J Behari, Bio-distribution and toxicity assessment of intravenously injected anti-HER2 antibody conjugated CdSe/ZnS quantum dots in Wistar rats, *I J Nanomedicine* 2011, 6 (1) 463-475. (IF-4.36)

- S-I Tanaka, J Miyazaki, *Dhermendra K. Tiwari*, T Jin, and Y Inouye, Fluorescent Platinum (Pt5) Nanoclusters: synthesis, isolation, characterization and its application to bio-imaging. *Angew Chem Int Ed.* 2011, 50 (2) 431-435. (IF-11.33)
- *Dhermendra K Tiwari*, T Jin, J Behari, Dose dependent in-vivo toxicity assessment of silver nanoparticle in Wistar rat. *Toxicol Mech Method* 2011, 21 (1) 13-24. (IF-1.5)
- T Jin, *Dhermendra K. Tiwari*, S-I Tanaka and Y Inouye, Antibody-proteinA conjugated quantum dot for multiplex imaging of surface receptor in living cells, *Molecular Biosystem (RSC)* 2010, 6 (11) 2225-31. (IF-3.6)
- *Dhermendra K. Tiwari*, Shin-ichi Tanaka, Y Inouye, K Yoshijawa, T M Watanabe and T Jin, Synthesis and characterization of anti-HER2 antibody conjugated CdSe/CdZnS quantum dots for fluorescence imaging of breast cancer cells. *Sensors* 2009, 9 (11) 9332-9354. (IF-2.43)
- *Dhermendra K Tiwari*, J Behari and P. Sen, Time and dose dependent antimicrobial Potential of Ag-nanoparticle Synthesized by Top-down approach. *Current Science* 2008, 95 (5) 647-655. (IF-0.96)

#### **REVIEW ARTICLES:**

- *Dhermendra k Tiwari\**, Manisha Tiwari\*, B R Sahoo. Optical nanoscopy tool for biologist: Advancement of fluorophore and optics for high-resolution and live-cell imaging, *Current Science*, 112 (4), 714-724, 2017. (\*corresponding author), **Highlighted on cover page.**
- Uno S\*, *Dhermendra K Tiwari\**, Kamiya M, Nagai T and Urano Y. A guide to use photocontrollable fluorescent proteins and synthetic smart fluorophores for nanoscopy. *Microscopy (Oxford Press)*, 2015, 64(4):263-77. **(Invited)**
- *Dhermendra K Tiwari* & T Nagai, Smart fluorescent proteins: Innovation for barrier-free superresolution imaging, *Develop. Growth Differ.* 2013, 55 (4) 491-507. **(Invited)**
- *Dhermendra K. Tiwari*, J. Behari and Prasenjit Sen, Application of Nanoparticle in Waste Water Treatment. *World App. Sci J*, 3 (3): 417-433, 2008.

#### **UNDER PREPARATION**

- *Dhermendra K Tiwari*; Y Arai; and T Nagai, Photoswitchable fluorescent protein for molecular counting assisted-PALM.
- Hiroshi Takauchi, *Dhermendra K Tiwari*; Y Arai; and T Nagai. Fast photoswitchable Dreiklang for 3D-PALM of live sample.

#### **BOOK / MONOGRAM**

- *Dhermendra K Tiwari* and J Behari. Antibacterial properties of zero-dimensional silver nanoparticle (ISBN-978-3-8383-7719-3, LAMBERT Academic Publishing AG & Co. KG, Germany).
- *Dhermendra K Tiwari*. Bioimaging application and biocompatibility of nanoparticle: Nanoparticle for fluorescence imaging. (ISBN-10: 3659396311 | ISBN-13: 978-3659396311, LAMBERT Academic Publishing AG & Co. KG, Germany).

#### **INVITED TALKS**

- Low laser power nanoscopy imaging using ultrafast photoswitchable fluorescent protein. Department of Biochemistry, Punjab University, Chandigarh.
- Kohinoor, a photoswitchable fluorescent protein for low laser power RESOLFT nanoscopy, Department of human genetics, Central university of Punjab, Bathinda, India

#### **NATIONAL/INTERNATIONAL RESEARCH VISITS**

- 2<sup>nd</sup> Bangalore microscopy course (Int. microscopy training program), National Center of Biological Science (NCBS) and 100X imaging facility, Bangalore, India (21-28 Feb 2010)
- Six month research visit to Immunology frontier research center (IFReC), Osaka University.
- General microbiology and molecular biology techniques used in laboratory?
- Summer School Training in Bionanoscience (GCOE program), School of Frontier Bioscience, Osaka University, Japan (14-26, July-2008).

- Indo-US advance School on Quantum and Nano-computing System and Application, Dayalbagh Educational Institute, Agra- India from 11-14Dec.

## **NATIONAL/INTERNATIONAL CONFERENCES**

- Participated in **Nobel Prize Dialogue, Tokyo** 2015 held at International conventional center Tokyo, Japan by Nobel Media and JSPS. 01 March, 2015.
- *Dhermendra K Tiwari*, Fluorescent protein and Bioimaging, **(Talk)** *JSPS science dialogue program*, Senior High school, Okinawa, Japan. 20 Feb 2015.
- *Dhermendra K Tiwari*, Fluorescent protein, **(Talk)** *JSPS science dialogue program*, Utsunomiya Girl's Highschool, Japan, 22 Oct, 2014.
- *Dhermendra K Tiwari*, Y. Arai, M. Yamanaka, T. Dertinger, K. Fujita, T. Nagai. Fast positively photoswitchable fluorescent protein for live cell superresolution imaging. **(Talk)** 11<sup>th</sup> May 2014, 70<sup>th</sup> Japanese microscopy society conference, Chiba, Japan.
- *Dhermendra K Tiwari*, Y. Arai, M. Yamanaka, K. Fujita, T. Nagai. A novel photoswitchable fluorescent protein for nanoscopy. **(Talk)** 16<sup>th</sup> April 2014, *Focus on Microscopy conference (FOM-2014)*, University of Sydney, Australia.
- *Dhermendra K Tiwari*, Y. Arai, M. Yamanaka, K. Fujita, T. Nagai. Kohinoor, a Photoswitchable fluorescent protein for superresolution imaging **(Talk)** 2-4 December 2013, *First Osaka University-EPFL International symposium*, Osaka, Japan.
- *Dhermendra K Tiwari* and Takeharu Nagai. Reversibly fastest positive switching fluorescent protein for superresolution nanoscopy. **(Poster)** 16<sup>th</sup> October 2013, *Biophysical society meeting of Japan*, Kyoto, Japan.
- *Dhermendra K Tiwari*, Yoshiyuki Arai, Tomoki Matsuda, Takeharu Nagai. Beyond the diffraction limit with an advanced photoswitching fluorescent protein. **(Talk)** 13<sup>th</sup> November, 2013, *XXIII ISMS conference*, Nigata, Japan
- *Dhermendra K Tiwari* and Takeharu Nagai. Rapidly switching and highly photostable reversibly photoswitching fluorescent protein for video-rate nanoscopy imaging. **(Poster)** 15<sup>th</sup> September, 2013, *Annual Meeting of Bioimaging Society, Tokyo University, Tokyo, Japan*.
- *Dhermendra K Tiwari* and J Behari. Bioimaging application and cytotoxicity study of anti-HER2ab conjugated Quantum dots. **(Talk)**, 5<sup>th</sup> March 2011. *Conference "Microwave field measurement, biological effects and application in nanoscience"* Jawaharlal Nehru University, New Delhi, India.
- *Dhermendra K Tiwari*, Takashi Jin and J Behari. Bioimaging and Cytotoxicity Study of Anti-HER2 Antibody Conjugated CdSe/CdZnS Quantum Dots Specifically Designed for Early Breast Cancer Detection **(Poster)**. 21Feb, 2010, 2<sup>nd</sup> Bangalore microscopy course, *National Center for Biological Science (NCBS)*, Bangalore, India.
- *Dhermendra K Tiwari* and Takashi Jin. Synthesis of Herceptin conjugated quantum dots and application for Breast cancer Imaging **(Talk)**, May 11<sup>th</sup>, 2009, *Bioimaging Conference at Osaka University*, Japan.
- *Dhermendra K Tiwari* and Takashi Jin. Development of highly fluorescent HER-2 conjugated Q-dot for breast cancer imaging **(Poster)**, 18<sup>th</sup> June 2009, *Delegates visit to Immunos, Level 4, Matrix Building, Biopolis street, Singapore*.
- *Dhermendra K Tiwari* and J Behari. Antibacterial effect of Silver Nanoparticle against *Escherichia coli* and *Bacillus subtilis*. **(Talk)**, 7<sup>th</sup> Nov 2009. *Venue: Jawaharlal Nehru University, New Delhi, India*.
- *Dhermendra K Tiwari* and J Behari. Silver nanaoparticle and its antibacterial properties. **(Talk)**, 25<sup>th</sup> July 2008. *Global COE summer training program, Osaka University, Japan*.

## **MEMBERSHIP**

- **Associate editor**, International journal of biological and medical science, published from catalyst publisher, India.
- Reviewer committee member of "*Nanotechnology Journal*" **(IOP ID: 18125)** published from Institute of Physics (IOP), UK.

- Reviewer committee member of “*Journal of Physics D: Applied physics*” published from Institute of Physics (IOP), UK.
- Reviewer committee member of “*Measurement Science and Technology*” published from Institute of Physics (IOP), UK.
- **Founder** of Merge+classroom Academy.

**(Reviewed over 30 peer reviewed paper for the above journals as on June, 2015)**

## **TECHNICAL EXPERTIES**

### *Microscopies/Nanoscopy and research instruments expertise*

- Selective plane light illumination nanoscopy
- SPoD-ExPAN Nanoscopy
- PALM/pcSOFI/RESOLFT nanoscopy
- TIRF, Epifluorescence microscopy
- Laser confocal Microscopy (FV-1000, A1R-Nikon)
- Fluorescence microscopy (Various Nikon and Olympus microscopies)
- Sequencer, Countess automated cell counter, PCR, UV-visible spectrophotometer, HPLC, Countess automated cell counter, Flowcytometry.

### *Molecular Biology and Biochemistry Techniques*

- Isolation of DNA (plasmid and genomic), RNA
- Primer design, PCR, RT-PCR, Random mutagenesis PCR, Quik Change PCR
- Nucleic acid (DNA and RNA) and protein blotting,
- Primer extension and nucleic acid sequencing.
- Genetic engineering of fluorescent proteins.
- Identification and characterization of protein sequences in bacteria.
- Recombinant protein expression, mutant screening and purification
- Immunostaining and immunolabeling

### *In-vitro cell culture experiment*

2D and 3D culture, Epithelial and Mechanchymal culture, PC12 Cell culture, Neuronal cell culture, KPL-4 breast cancer, HeLa, MCF-7, COS7, HEK293, MDCK, S180, A431D, Can-10 and Hepatocyte primary cell culture.

### *In-vivo animal experiment*

Small lab animal (mice and rat) handling, intravenous, intra-peritoneal and intra-dermal injection of drug or chemicals, blood sapling from eye and heart, organ removal (Bone marrow, liver, brain, kidney, spleen and testis), liver perfusion, cannulation, tissue fixation, mounting and sectioning.

### *Computer/Software expertise*

- rapidSTORM, QuickPALM, ThunderSTORM
- Image J (With several plugin), µManager
- Metamorph image analysis software,
- NIS element, FV-10 ASW,
- Serial cloner, EnzymeX, GENETYX, Codon code aligner
- Origin, IGOR-Pro
- MS-office, Mac-office, Adobe-photoshop, Adobe-illustrator, Axio-vision

- Well acquainted with different databases like PubMed, GenBank, EMBL, CMR, PDB, SWISSPROT, PDB.