

Balachandra G. Hegde, M.Sc., Ph.D., (Physics).

(Recipient of the best paper award (ARP) from Vision Group on Science and Technology Dept. of IT, BT &ST, Govt. of Karnataka for the year 2016-17)

Current position: **Professor and Chairman.**
Department of Physics,
Dean, School of Basic Sciences
Rani Channamma University,
Belagavi- 591156, Karnataka
Mobile: 0827 733 6421,
bghegde@rcub.ac.in

Date of Birth : **10-08-1965**

Research Experience: **17 years (10 years in University of Southern California, Los Angeles, California, USA)**

Teaching experience: **29 years**

Current ongoing research projects: **2**

**i. Vision Group on Science and Technology (VGST), Karnataka
Rs: 20 lakhs:**

Title: “Monodisperse manganite nano particle synthesis and characterization by contactless conductivity and susceptibility measurements”.

**ii. DBT under North East Twinning Programme
Rs: 40 Lakhs**

Title: Investigation in to structural organization and curvature-dependent membrane binding of alpha synuclein”

EDUCATION:

1994 – 2002 **Ph.D.** in Condensed Matter Physics
BANGALORE UNIVERSITY, Bangalore, India
Collaboration INDIAN INSTITUTE OF SCIENCE, Bangalore, India,
Ph.D., Thesis: Electron Spin Resonance Study of Radiation Damage Pathways
and Phase Transitions in Certain Inorganic Perchlorates.

1987 – 1989 **Master of Science (Solid State Physics)**
KARNATAKA UNIVERSITY, Dharwad, India,

1983 – 1987 **Bachelor of Science (Physics Major)**
KARNATAKA SCIENCE COLLEGE, Dharwad, India,

EXPERIENCE:**Teaching: (29 years)**

- Sept 2016* **Professor**
 –*Current* Post Graduate Department of Physics,
 Rani Channamma University, Belagavi, Karnataka India
- Aug 2013* **Associate Professor**
 –*Aug 2016* Post Graduate Department of Physics,
 Rani Channamma University, Belagavi, Karnataka India
- Aug 2012* **Associate Professor**
 – *Aug 2013* PES Institute of Technology
 Bangalore, India
- 2002 - 2012* **Lecturer/Research Scientist**
 Department of Biochemistry and Molecular Biology,
 UNIVERSITY OF SOUTHERN CALIFORNIA, Los Angeles, California, USA,
 • Subject: “Physical Methods in Biochemistry and Molecular Biology” for
 Masters and Ph. D., students.
- 1990 – 2002* **Senior Scale Lecturer/Reader**
 Department of Physics.
 SRI BHAGWAN MAHAVEER JAIN COLLEGE, Bangalore
 • Teaching Bachelor of Science (B.Sc.) Physics course. Topics covered in this
 period includes, Heat and Thermodynamics, Sound and Waves, Optics,
 Electricity and Magnetism, Modern Physics – Atomic and Molecular Physics,
 Relativity and Quantum Mechanics, Solid State Physics, and Electronics.
 • Responsible for setting up undergraduate Physics laboratory of a newly started
 department.

Research: (16 years)

- 08/2013-present* *Professor/Associate Professor* Post Graduate Department of Physics,
 Rani Channamma University, Belagavi, Karnataka India.
- 07/2007-02/2012* **Research Scientist**
 Department of Biochemistry and Molecular Biology
 Zilkha Neurogenetic Institute
 UNIVERSITY OF SOUTHERN CALIFORNIA, Los Angeles, CA, USA

Research area: *Employing Biophysical techniques such as pulse electron paramagnetic resonance spectroscopy, electron microscopy and circular dichroism to determine the structure of amyloid fibrils, oligomers and membrane tubulating proteins. In addition, teaching graduate students in the discipline of Physical Methods in Molecular Biology.*

06/2002-06/2007 **Research Associate**

Department of Biochemistry and Molecular Biology,
Zilkha Neurogenetic Institute

UNIVERSITY OF SOUTHERN CALIFORNIA, Los Angeles, CA, USA

Research area: *Employing Electron Paramagnetic Resonance techniques to elucidate the structure of membrane-bound proteins and amyloid beta fibrils. Expertise in Pulse EPR techniques, Site-Directed Mutagenesis, PCR, DNA purification, Recombinant protein expression, purification and spin labeling for EPR analysis. Electron microscopy, AFM, chromatography, reverse phase and ion exchange chromatography.*

PEER-REVIEWED JOURNAL ARTICLES

1. Melo A A, **Hegde B G**, Shah C, Larsson E, Isas M J, Kunz S, Lundmark R, Langen R, Daumke O. Structural insights into the activation mechanism of dynamin-like Eps15-homology domain proteins. *Proc Natl Acad Sci U S A*. (2017) **114(22)**:5629-5634.
2. **B G Hegde**, Electron Paramagnetic Resonance: Biological Applications, *Resonance* (2015) 20 (11) 1017-1032.
3. Mark Ambroso, **Hegde BG**, Ralf Langen. Endophilin A1 induces different membrane shapes using a conformational switch that is regulated by phosphorylation. *Proc. Natl. Acad. Sci U S A*. (2014) **111(19)**:6982-7.
4. **Hegde BG**, Shah C, Morén B, Lundmark R, Daumke O and Langen R. Structural Insights into Membrane Interaction and Caveolar Targeting of Dynamin-like EHD2. *Structure* (2014), **22(3)**:409-20
5. J Varkey, N Mizuno, **BG Hegde**, N Cheng, AC Steven, R Langen. α -synuclein oligomers with broken helical conformation form lipoprotein nanoparticles. *J of Biol Chem*. **288 (24)**, 17620-30 (2013).
6. Mizuno N, Varkey J, Kegulian NC, **Hegde BG**, Langen R and StevenAC. Remodeling of lipid vesicles into cylindrical micelles by α -synuclein in an extended α -helical conformation. *J Biol Chem*. **287(35)**: 29301-11 (2012).
7. Yiyu Li, S Bedrood, **BG Hegde**, R Langen, I S Haworth. EPR-based computational modeling of the fibril structure of human islet amyloid polypeptide (hIAPP). *Abstracts Of Papers Of The*

American Chemical Society, Volume 243 (2012)

8. Krishnamani V, **Hegde BG**, Langen R, Lanyi JK. Secondary and Tertiary Structure of Bacteriorhodopsin in the SDS Denatured State. *Biochemistry*. **51(6)**:1051-60 (2012).
9. Bedrood S, Li Y, Isas JM, **Hegde BG**, Baxa U, Haworth IS, Langen R. Fibril Structure of Human Islet Amyloid Polypeptide. *J Biol Chem*. **287(8)**:5235-41 (2012).
10. Hatmal MM, Li Y, **Hegde BG**, Hegde PB, Jao CC, Langen R, Haworth IS. Computer Modeling of Nitroxide Spin Labels on Proteins. *Biopolymers*. 97(1):35-44 (2012).
11. O Daumke, S Gao, K Fälber, C Shah, R Lundmark, H McMahon, **BG Hegde**, R Langen, A von der Malsburg, G Kochs, O Haller. Structure, oligomerization and mechanism of dynamin superfamily proteins. *Acta Crystallographica*, A67, C63 (2011)
12. Rao JN, Jao CC, **Hegde BG**, Langen R, Ulmer TS. A combinatorial NMR and EPR approach for evaluating the structural ensemble of partially folded proteins. *J Am Chem Soc*. **132** 8657-68 (2010).
13. Jao CC, **Hegde BG**, Gallop JL, Hegde PB, McMahon HT, Haworth IS and Langen R. Roles of amphipathic helices and BAR domain of endophilin in membrane curvature generation. *J Biol Chem*. **285**, 20164-70 (2010).
14. Lakshminarayanan R, Il Yoon, **Hegde BG**, Daming Fan, Chang Du, Oldak JM. Analysis of secondary structure and self-assembly of amelogenin by variable temperature circular dichroism and isothermal titration calorimetry. *Proteins: Structure, Function, and Bioinformatics*. **76**, 560-9 (2009).
15. Jao CC, **Hegde BG**, Chen J, Haworth IS, Langen R. Structure of membrane-bound α -synuclein from site-directed spin labeling and computational refinement. *Proc Natl Acad Sci U S A*. **105**, 19666-71(2008).
16. Henne WM, Kent HM, Ford MGJ, **Hegde BG**, Daumke O, Butler PJG, Mittal R, Langen R, Evans PR, and McMahon HT. Structure and Analysis of FCHO2 F-BAR Domain: A Dimerising and Membrane Recruitment Module that Effects Membrane Curvature. *Structure* **15**, 1-4 (2007).
17. **Hegde BG**, Isas JM, Zampighi G, Haigler HT, and Langen R. A novel calcium-independent peripheral membrane-bound form of annexin B12. *Biochemistry* **45**, 934-942 (2006).
18. Raghavan SC, Chastain P, Lee JS, **Hegde BG**, Houston S, Langen R, Hsieh CL, Haworth IS, Lieber MR. Evidence for a Triplex DNA Conformation at the bcl-2 Major Breakpoint Region of the t(14;18) Translocation. *J Biol. Chem*. **280**, 22749-60 (2005).
19. Raghavan SC, Houston S, **Hegde BG**, Langen R, Haworth IS, Lieber MR. Stability and Strand Asymmetry in the Non-B DNA Structure at the bcl-2 Major Breakpoint *J Biol. Chem*. **279**, 46213-25 (2004).

20. **Hegde BG**, Isas JM, Haigler HT, Langer R. Different conformations induced by pH-dependent membrane binding of annexin 12, *Biophysical Journal* 86 (1), 373A-373A (2004).
21. **Hegde BG**, Anand A. and Bhat SV. ESR Evidence for Mirror Symmetry Conservation during Radiation damage of X - Irradiated Single Crystals of KClO₄. *Applied Magnetic Resonance* 19,111 (2000).
22. **Hegde BG**, Rastogi A, Damle R, Chandramani R, and Bhat SV. An Electron Spin Resonance (ESR) study of ClO₃ radicals in NH₄ClO₄ single crystals. *Journal of Physics: Condensed Matter* 9, 3219 (1997).

CONFERENCE PRESENTATIONS: INTERNATIONAL AND NATIONAL

1. Structure of Membrane-Bound α -Synuclein: Combining Modeling with Continuous Wave and Pulsed EPR, 50th Rocky Mountain Conference on Analytical Chemistry, Breckenridge, Colorado USA. July 27–31, 2008.
2. Membrane Curvature Sensors and Inducers Studied by Site-Directed Spin Labeling, 50th Rocky Mountain Conference on Analytical Chemistry, Breckenridge, Colorado USA, July 27–31, 2008.
3. Structure of Membrane-Bound α -Synuclein: Combining Modeling with Continuous Wave and Pulsed EPR, Joint Meeting of the Biophysical Society and the International Biophysics Congress in Long Beach, California, February 2-6, 2008.
4. Protein misfolding and Protein-Membrane Interaction studied by Site-Directed Spin Labeling Hegde BG, Jao C, Isas JM and Langen R. Joint Conference of 12th *In Vivo* EPR Spectroscopy and Imaging 9th International EPR Spin Trapping/Spin Labeling. Chicago, IL 2007
5. Different Conformations Induced by pH Dependent Membrane Binding of Annexin 12 **Hegde BG**, Isas JM. Zampighi G. Haigler HT. and Langen R., *Biophysical Society 48th Annual Meeting*, Baltimore, ML, 2004.
6. ESR Evidence for Rotational Symmetry Conservation During Radiation Damage of Single Crystals of LiClO₄·3H₂O. **Hegde BG**, Rastogi A, Damle R, Chandramani R, and Bhat SV. T S R P- 98, Part-II, Preprint Volume, 285 (1998). (Trombay Symposium on Radiation and Photochemistry, Mumbai, India).
7. ESR Evidence For Mirror Symmetry Conservation During Radiation Damage of KClO₄ Single Crystals. **Hegde BG**, Anand A, Chandramani R and Bhat SV. Solid State Physics (India), 40C, 433 (1997). (DAE Solid State Physics Symposium).
8. ESR Study of Radicals Produced Using Electron Beam Irradiation. Damle R, **Hegde BG** and Bhat SV. International Conference on R & D Using Electron Accelerators, Mangalore University, India, Abstract, 22 (1995).

9. ClO_3 study of X-irradiated single crystals of NH_4ClO_4 , First meeting of National Magnetic Resonance Society, IISc, Bangalore 1995
10. Temperature Dependence of ClO_3 EPR in Single Crystals of NH_4ClO_4 . **Hegde BG**, Rastogi A, Damle R. Chandramani R, and Bhat SV: DAE Solid State Physics Symposium (India), 36C, 508 (1993).
11. EPR studies of ClO_3 radicals in single crystals of NH_4ClO_4 , DAE Solid State Physics Symposium Tirupati, BARC/Tirupati University 1992

WORKSHOPS AND SUMMER SCHOOLS:

1. Bruker Elexsys E-580 Pulse EPR Training Course, Bruker Biospin EPR Division, Manning Road, Billerica, MA, 01821, April 09 – 12, 2007.
2. Bruker EMX EPR Maintenance and Service Training Course, Bruker Biospin EPR Division, Manning Road, Billerica, MA, 01821, August 18 – 23, 2002.
3. Summer visiting teacher-fellow of Indian Academy of Sciences Worked with Prof. Balaram at Molecular Biophysics Unit, Indian Institute of Science, Bangalore – 560012 India, April 22 – June 21, 2002.
4. Refresher course in experimental Physics, Department of Physics, Goa University, Taleigao Plateau, Taleigao, Goa - 403206 India, Oct 12 – 29, 2001.
5. Workshop conducted by Physics Teachers forum, Bangalore University. St Joseph's College, Bangalore. Dec 1997.

INSTRUMENTATION SKILLS (Operation and Maintenance):

1. Bruker X-band Elexsys E-580 Pulse EPR spectrometer
2. Bruker X-band ER200D EPR spectrometer,
3. Bruker X-band EMX EPR spectrometer,
4. Oxford Instruments ESR900 continuous-flow cryostat equipped with ITC4 temperature controller (temperature down to 3.8 K).
5. Enraf Nonius Sealed tube X-ray machine equipped with Precession and Weisenburgh Camera.
6. Digital Instruments Multimode Scanning Probe Microscope (AFM).
7. JEOL 1400JEM Electron Microscope.
8. JASCO CD, UV/VIS and Spectrofluorometer.
9. AKTA HPLC/FPLC

RECOGNITION:

1. Best poster presentation by Postdoctoral Fellow (second place)
15th annual retreat, University of Southern California, 1501 San Pablo Street, Los Angeles
CA, USA 90089. October 24 – 25, 2004.
2. *Recipient of the best paper award (ARP) from Vision Group on Science and Technology Dept.
of IT, BT &ST, Govt. of Karnataka for the year 2016-17*

SCIENTIFIC ORGANIZATIONS:

American Biophysical Society (member)
Indian Physics Association (Life member)

ADMINISTRATIVE EXPERIENCE

1. Chairman, Department of Physics
2. Dean School of Basic Sciences
3. Member, Academic Council, RCUB.
4. Chairman, Board of Studies in Physics (PG), RCUB.
5. Chairman, Board of Studies in Physics (UG), RCUB.
6. Chairman, Board of Studies in Electronics (UG), RCUB.
7. Member, Board of Studies in Physics (PG), Karnatak University Dharwad.
8. Member, Board of Studies in Physics (PG), RLS College, Belagavi.