

## Dr. Pralay Das, Ph.D.

### Office Address:

Natural Product Chemistry & Process Division,  
CSIR-Institute of Himalayan Bioresource Technology,  
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### Main Research Domain

- Designing of new catalyst for C-C, C-X, oxidation, carbonylation, oxidative esterification and reduction reactions emphasis on regio- and chemo-selectivity
- Development of heterogeneous nano-particles as catalyst for hydrogen production and utilization using renewable resources (methanol and ethanol).
- Nano-catalyst intervention for detoxification and utilization of toxic gases
- Methodology development for total synthesis of biologically active compounds
- Scalable process for technology development
- Development of green protocols in organic synthesis
- Value addition of natural products

### Education

**Ph.D.** (2006, submitted 2005) Department of Chemistry, University of North Bengal, Darjeeling, West Bengal, India.

**M.Sc.** (2000) Organic Chemistry, Department of Chemistry, University of North Bengal, Darjeeling, West Bengal, India.

**B.Sc. (Chem. Hons)** (1998) Malda College, West Bengal.

### Professional/Postdoctoral Positions held

**2008-2012**

**Scientist**

Natural Product Chemistry and Process Development Division,  
Institute of Himalayan Bioresource Technology (Council of  
Scientific and Industrial Research), Palampur (H.P.)-176061, India

**2012-Continuing**

**Senior Scientist** (Same Division)

**2007-2008**

**Senior Research Scientist**

Chembiotek, Division of TCG Lifesciences Ltd., Kolkata, W.B.,  
India

**2005-2007**

**Post Doctoral Fellow**

Under the supervision of Prof. Fredrik Almqvist, Department of  
Organic Chemistry, Umea University, Umea, Sweden

**Awards & Recognitions**

**2006**

**Tetrahedron Letters Most Cited Paper 2003–06 Award” by  
Elsevier Ltd. Oxford, UK**

Microwave-assisted Suzuki coupling on a KF–alumina surface:  
synthesis of polyaryls, Basudeb Basu, **Pralay Das**, Md. M. H.  
Bhuiyan and Satadru Jha, *Tetrahedron Letters*, **2003**, 44(19), 3817-  
3820.

**2011-12**

Membership of American Nano Society  
Member ID: 113120

**List of Publications & Patents**

Sl. No.	Author Name	Title	Journal Name
58	Dhananjay Bhattacharjee, Vandna Thakur, Arun K. Shil, <b>Pralay Das</b>	Hypervalent iodine promoted aromatization of exo-cyclic $\beta$ -enaminones for the synthesis of meta- N,N-diarylaminophenols	<i>Adv. Synth. Catal.</i> <b>2017</b> (accepted). DOI: 10.1002/adsc.201700004.
57	Dhananjay Bhattacharjee, Vandna Thakur, Saurabh Sharma, Sandeep Kumar, Richa Bharti, C. Bal Reddy, <b>Pralay Das</b>	Iodine(III) Promoted Ring Contractive Cyanation of Exocyclic $\beta$ -enaminones to Cyanocyclopentanone Synthesis	<i>Adv. Synth. Catal.</i> <b>2017</b> (accepted).DOI: 10.1002/adsc.201601208.
56	Sandeep Kumar, Abha Chaudhary, Bandna, Dhananjay Bhattacharjee, Vandna Thakur and Pralay Das	Supported Palladium Nanoparticles as Switchable Catalyst for Aldehyde Conjugate/s and Acetate Ester Synthesis from Alcohols	<i>New Journal of Chemistry</i> , <b>2017</b> , DOI: 10.1039/C6NJ03769K
55	Richa Bharti, C.	Supported Palladium Nanoparticles	<i>Appl. Organometal Chem.</i>

	Bal Reddy, Sandeep Kumar, <b>Pralay Das</b>	Catalyzed Suzuki- Miyaura Cross-coupling Approach for Amino-Aryl-Benzosuberene Analogues Synthesis from Natural Precursor	<b>2017</b> (accepted). DOI: 10.1002/aoc.3749
<b>54</b>	Nitul Ranjan Guha, Vandna Thakur, Dhananjay Bhattacharje, Richa Bharti, <b>Pralay Das</b>	Supported Rhodium Nanoparticle Catalyzed Intermolecular Regioselective Carbonylative Cyclization of Terminal Alkynes Using Oxalic Acid as Sustainable C1 Source	<i>Adv. Synth. Catal.</i> <b>2016</b> , 358, 3743-3747 (IF. 6.4)
<b>53</b>	Sandeep Kumar, Saurabh Sharma and <b>Pralay Das</b>	Supported Gold Nanoparticles-Catalyzed Microwave-Assisted Hydration of Nitriles to Amides under Base-Free Conditions	<i>Adv. Synth. Catal.</i> 2016, 358, 2889-2894 (IF. 6.4)
<b>52</b>	C. Bal Reddy, Richa Bharti, Sandeep Kumar, and <b>Pralay Das</b>	Supported palladium nanoparticles-catalyzed decarboxylative coupling approaches to aryl alkynes, indoles and pyrrolines synthesis	<i>RSC Adv.</i> , 2016,6, 71117-71121 (IF. 3.2)
<b>51</b>	Arun K. Shil, Sandeep Kumar, C. Bal Reddy, Sumit Dadhwal, Vandna Thakur, and <b>Pralay Das</b>	Supported Palladium Nanoparticle-Catalyzed Carboxylation of Aryl Halides, Alkenylsilanes, and Organoboronic Acids Employing Oxalic Acid as the C <sub>1</sub> Source	<i>Synfacts</i> 2016, 12(2), 0217 (Highlight)
<b>50</b>	Nitul Ranjan Guha, Saurabh Sharma, Dhananjay Bhattacharje, Vandna Thakur, Richa Bharti, C. Bal Reddy, <b>Pralay Das</b>	Oxidative “reverse-esterification” of ethanol with benzyl/alkyl alcohols or aldehydes catalyzed by supported rhodium nanoparticles	<i>Green Chemistry</i> , 2016, 18, 1206-1211. (IF. 8.5)
<b>49</b>	Vandna Thakur, Dharminder Sharma, <b>Pralay Das</b>	Ethyl 3-(2,4-dioxocyclohexyl)propanoate as a novel precursor for N-substituted 4,4a,5,6-tetrahydroquinoline-2,7(1H,3H)-diones and their corresponding 3,4-dihydro-7-hydroxyquinolin-2(1H)-ones and 7-hydroxyquinolin-2(1H)-ones synthesis	<i>Mol Divers</i> 2016 20, 29–40
<b>48</b>	Arun K. Shil, Sandeep Kumar, C. Bal Reddy, Sumit Dadhwal,	Supported Palladium Nanoparticle-Catalyzed Carboxylation of Aryl Halides, Alkenylsilanes, and Organoboronic Acids Employing Oxalic Acid as the C <sub>1</sub> Source	<i>Org. Lett.</i> , <b>2015</b> , 17 (21), pp 5352–5355 (IF. 6.7)

	Vandna Thakur, and <b>Pralay Das</b>		
47	Nitul Ranjan Guha, Dhananjay Bhattacharjee and Pralay Das	Polystyrene trimethyl ammonium chloride impregnated Rh(0) (Rh@PMe <sub>3</sub> NCl) as a catalyst and methylating agent for esterification of alcohols through selective oxidation of methanol	<i>Catal. Sci. Technol.</i> , 2015, 5, 2575–2580. (IF. 5.4)
46	Arun K. Shil and <b>Pralay Das</b>	Polystyrene resin supported palladium(0) (Pd@PR) nanocomposite catalyzed synthesis of β-aryl and β,β-diaryl unsaturated scaffolds following tandem approaches	<i>RSC Adv.</i> , 2015, 5, 24859-24863 (IF. 3.2)
45	Arun K Shil, Sandeep Kumar, Saurabh Sharma, Abha Chaudhary and <b>Pralay Das</b>	Polystyrene resin supported palladium(0) (Pd@PR) nanocomposite mediated regioselective synthesis of 4-aryl-1-alkyl/(2-haloalkyl)-1H-1,2,3-triazoles and their N-vinyl triazole derivatives from terminal alkynes	<i>RSC Adv.</i> , 2015, 5, 11506-11514. (IF. 3.2)
44	Abha Chaudhary and <b>Pralay Das</b>	Strategies for Functionalized Benzocycloheptene amines Synthesis	<i>Current Organic Chemistry</i> , 2015, 19(2), 179-196.
43	Nitul Ranjan Guha, Dhananjay Bhattacharjee, <b>Pralay Das</b>	Solid supported rhodium(0) nanoparticles: An efficient catalyst for chemo- and regio-selective transfer hydrogenation of nitroarenes to anilines under microwave irradiation	<i>Tetrahedron Lett.</i> 2014, 55, 2912-2916.
42	C. Bal Reddy, Arun K. Shil, Nitul Ranjan Guha, Dharminder Sharma, and <b>Pralay Das</b>	Solid Supported Palladium(0) Nanoparticles: An Efficient Heterogeneous Catalyst for Regioselective Hydrosilylation of Alkynes and Suzuki Coupling of β-Arylvinyl Iodides	<i>Catalysis Lett.</i> , 2014, 144, 1530-1536.
41	Abha Chaudhary, Swati Sood, <b>Pralay Das</b> , Pushpinder Kaur, Isha Mahajan, Arvind Gulati, Bikram Singh	Synthesis of Novel Antimicrobial Aryl Himachalene Derivatives from Naturally Occurring Himachalenes,	<i>EXCLI Journal</i> 2014, 13, 1216-1225.
40	Arun K Shil and <b>Pralay Das</b>	Solid Supported Platinum(0) Nanoparticles Catalyzed Chemo-selective Reduction of Nitroarenes to N-Arylhydroxylamines	<i>Green Chemistry</i> , 2013, 15, 3421–3428. (IF. 8.5)
39	Sandeep Kumar and <b>Pralay Das</b>	Solid-supported ruthenium(0): an efficient heterogeneous catalyst for hydration of nitriles to amides under microwave irradiation	<i>New J. Chem.</i> , 2013, 37, 2987-2990 (IF. 3.2)
38	Arun K. Shil,	Solid supported palladium (0) nano/microparticles	<i>RSC Advances.</i> ,

	Nitul Ranjan Guha, Dharminder Sharma, <b>Pralay Das</b>	catalyzed ultrasound induced continuous flow technique for large scale Suzuki reaction	2013, 3, 13671-13676. (IF. 3.2)
37	Dharminder Sharma, C. Bal Reddy, Arun K. Shil, Rashi Prakash Saroach, <b>Pralay Das</b>	Cyclohexyl iodide promoted approach for coumarin analogue synthesis using small scaffold	<i>Molecular Diversity</i> , 2013, 17, 651–659.
36	<b>Pralay Das</b> , Nidhi Aggarwal, Nitul Ranjan Guha,	Solid supported Ru(0) nanoparticles: an efficient ligand-free heterogeneous catalyst for aerobic oxidation of benzylic and allylic alcohol to carbonyl	<i>Tetrahedron Lett.</i> 2013, 54, 2924-2028.
35	Dharminder Sharma, Bandna, C. Bal Reddy, Sandeep Kumar, Arun K. Shil, Nitul Ranjan Guha and <b>Pralay Das</b>	Microwave assisted solvent and catalyst free method for novel classes of $\beta$ -enaminoester and acridinedione synthesis,	<i>RSC Advances</i> , 2013, 3, 10335-10340. (IF. 3.2)
34	Bandna, Dharminder Sharma, and <b>Pralay Das</b>	Cyanoalkyl amines: as an efficient reagent to stabilize palladium nano/microparticles for Suzuki and basic media for palladium(II) catalyzed Heck cross coupling reaction	<i>Nano Bulletin</i> 2013, 2(2), 130211 (Invited).
33	<b>Pralay Das</b> , Dharminder Sharma, Bikram Singh	Substituted cyclohexane-1,3-dione compounds process for preparation thereof and its application	US 2013/0079545 A1.
32	Vikas Jaitak, V K Kaul and <b>Pralay Das</b>	Environmentally benign Michael and Claisen Schmidt reaction of aromatic carbonyl compounds by alkaline polyionic resin	<i>Indian J. Chem.</i> , 2013, 52B (8), 1137-1145.
31	Nitul Ranjan Guha, Chennayala Bal Reddy, Nidhi Aggarwal, Dharminder Sharma, Arun K Shil, Bandna, <b>Pralay Das</b>	Solid supported Rh(0) nano/microparticles: an efficient ligand free heterogeneous catalyst for microwave assisted Suzuki-Miyaura cross coupling reaction	<i>Adv. Synth. Catal.</i> 2012, 354, 2911-2915. (IF. 5.4)
30	Dharminder Sharma, Sandeep Kumar, Arun K.	Solid supported palladium(0) nano/microparticle: a ligand-free efficient recyclable heterogeneous catalyst for mono- and $\beta,\beta$ -double-Heck reaction	<i>Tetrahedron lett.</i> 2012, 53, 7044-7051.

	Shil, Nitul Ranjan Guha, Bandna, <b>Palay Das</b>		
29	Arun K. Shil, Dharminder Sharma, Nitul Ranjan Guha and <b>Pralay Das</b>	Solid supported Pd(0): an efficient recyclable heterogeneous catalyst for chemoselective reduction of nitroarenes	<i>Tetrahedron Lett.</i> 2012, 53, 4858-4861.
28	Bandna, Nitul Ranjan Guha, Arun K. Shil, Dharminder Sharma, <b>Pralay Das</b>	Ligand free solid supported Palladium(0) nano/microparticles promoted C-O, C-S and C-N cross-coupling reaction	<i>Tetrahedron Lett.</i> 2012, 53, 5318-5322.
27	Abha Chaudhary, <b>Pralay Das</b> , Awanish Mishra, Pushpinder Kaur, Bikram Singh, Rajesh K. Goel	Naturally occurring himachalenes to benzocycloheptene amino vinyl bromide derivatives: as antidepressant molecules	<i>Molecular Diversity</i> , 2012, 16 (2), 357-366.
26	Pushpinder Kaur, <b>Pralay Das</b> , Abha Chaudhary and Bikram Singh	Naturally occurring limonene to cinnamyl-type $\gamma$ -butyrolactone substituted aldol condensation derivatives as antioxidant compounds,	<i>Natural Product Communications</i> , 2012, 7 (9), 1127-1130.
25	Dharminder Sharma, Bandna, Arun K. Shil, Bikram Singh, <b>Pralay Das</b>	Consecutive Michael-Claisen process for cyclohexane-1,3-dione derivatives (CDD) synthesis from unsubstituted and substituted acetone	<i>Synlett</i> , 2012, 23(8) 1199-1204.
24	Bandna, Nidhi Aggarwala, <b>Pralay Das</b>	Solid-supported Pd(0): an efficient heterogeneous catalyst for aerobic oxidation of benzyl alcohols into aldehydes and ketones	<i>Tetrahedron Lett.</i> 2011, 52, 4954-4956.
23	<b>Pralay Das</b> , Dharminder Sharma, Arun K. Shil, Avnesh Kumari	Solid-supported palladium nano and microparticles: an efficient heterogeneous catalyst for ligand-free Suzuki-Miyaura cross coupling reaction	<i>Tetrahedron Lett.</i> 2011, 52, 1176-1178.
22	Erik Chorell, Christoffer Bengtsson, Thomas Sainte- Luce Banchelin, <b>Pralay Das</b> , Hanna Uvell,	Synthesis and application of a bromomethyl substituted scaffold to be used for efficient optimization of antivirulence activity	<i>European Journal of Medicinal Chemistry</i> , 2011, 46, 1103-1116 (IF. 3.7)

	Arun K. Sinha, Jerome S. Pinkner, Scott J. Hultgren and Fredrik Almqvist		
21	Pushpinder Kaur, <b>Pralay Das</b> , Abha Chaudhary, Bikram Singh	Amine and thiazole substituted $\gamma$ -butyrolactones from naturally occurring limonene	<i>Canadian Journal of Chemistry</i> , 2011, 89, 1-6.
20	Indra Sandal, Amita Bhattachary, Uksha Saini, Devinder Kaur, Shveta Sharma, Ashu Gulati, Jonnala K Kumar, Neeraj Kumar, Jyotsna Dayma, <b>Pralay Das</b> , Bikram Singh, Paramvir S Ahuja	Chemical modification of L-glutamine to alpha-amino glutarimide on autoclaving facilitates Agrobacterium infection of host and non-host plants: a new use of a known compound	<i>BMC Chemical Biology</i> , 2011, 11:1.
19	<b>Pralay Das</b> , Dharminder Sharma, Bikram Singh	Substituted cyclohexane-1,3-dione compounds, process for preparation thereof and its applications	WO/2011/117881, 2011.
18	Vikash Jaitak, Bandna, <b>Pralay Das</b> , V. K. Kaul, Neeraj Kumar and Bikram Singh	One-pot multicomponent Michael and Thorpe-Ziegler reaction of aryl methyl ketones	<i>Synth. Commun.</i> 2011, 41, 2727- 2737.
17	<b>Pralay Das</b> , Dharminder Sharma, Manish Kumar, Bikram Singh	Copper promoted C-N and C-O type cross-coupling reactions	<i>Current Organic Chemistry</i> , 2010, 14(8), 754-783.
16	Fredrik Almqvist, M. Sellstedt, <b>Pralay Das</b>	New Peptidomimetic Compounds	WO/2009/134203, 2009

15	Basudeb Basu, Sajal Das, <b>Pralay Das</b> , Bablee Mandal, D. Banerjee and Fredrik Almqvist	Palladium supported on poly-ionic resins as efficient, ligand free and recyclable catalyst for Heck, Suzuki-Miyaura and Sonagashira reactions	<i>Synthesis</i> , 2009, 1137-1146.
14	Basudeb Basu, Bablee Mandal, Sajal Das, <b>Pralay Das</b> and Ashis K. Nanda,	Chemoselective reduction of aldehydes by ruthenium trichloride and resin-bound formats	<i>Beilstein J. Org. Chem.</i> 2008, 4, 53.
13	Basudeb Basu, <b>Pralay Das</b> and Sajal Das	Recent Advances in KF/alumina Promoted Organic Reactions	<i>Current Organic Chemistry</i> , 2008, 12(2), 141-158.
12	V. Åberg, <b>Pralay Das</b> , Erik Chorell, M. Hedenström, Jerome S. Pinkner, S. J. Hultgren, Fredrik Almqvist	Carboxylic acid isosteres improve the activity of ring-fused 2-pyridones that inhibit pilus biogenesis in <i>E. coli</i>	<i>Bioorg. Med. Chem. Lett.</i> 2008, 18, 3536-3540.
11	Fredrik Almqvist, Erik Chorell, <b>Pralay Das</b> , H. Emtenas, O. Fjellstrom, M. Mogemark, M. Polla, V. Aberg	1H-Pyridine-2-one derivatives useful in treatment of PAI-1 related disorders	WO/2008/054290, 2008.
10	Erik Chorell, <b>Pralay Das</b> and Fredrik Almqvist	Diverse functionalization of thiazolo ring-fused 2-pyridones	<i>J. Org. Chem.</i> 2007, 72, 4917-4924 (IF. 4.6)
9	Basudeb Basu, <b>Pralay Das</b> , Sajal Das	Transfer hydrogenation using recyclable polymer-supported formate (PSF): Efficient and chemoselective reduction of nitroarenes	<i>Molecular Diversity</i> , 2005, 9(4), 259.
8	Basudeb Basu, Sajal Das, <b>Pralay Das</b> , Ashis K.	Co-immobilized formate anion and palladium on a polymer surface: a novel heterogeneous combination for transfer hydrogenation	<i>Tetrahedron Lett.</i> 2005, 46, 8591.

Nanda			
7	Basudeb Basu, <b>Pralay Das</b> , Ashis K. Nanda, Sajal Das, Sajal Sarkar	Palladium-catalyzed selective amination of haloaromatics on KF-alumina surface	<i>Synlett.</i> 2005, 16 (8), 1275-1278.
6	Basudeb Basu, <b>Pralay Das</b> , Ismail Hossain	Synthesis of $\beta$ -amino esters via aza-Michael addition of amines to alkenes promoted on silica: a useful and recyclable surface	<i>Synlett.</i> 2004, 15 (14), 2630-2632.
5	Basudeb Basu, Pralay Das, Ismail Hossain	KF-alumina-mediated selective double Michael additions of aryl methyl ketones: a facile entry to the synthesis of functionalized pimelate esters and derivatives	<i>Synlett.</i> 2004, 15 (12), 2224-2226.
4	<b>Pralay Das</b> and Basudeb Basu	Microwave-assisted copper promoted <i>N</i> -arylation of amines with aryl boronic acids/salts on a KF-alumina surface	<i>Synth. Commun.</i> 2004, 34(12), 2177 – 2184.
3	Basudeb Basu, <b>Pralay Das</b> , Md. M. H. Bhuiyan and Satadru Jha	Microwave-assisted Suzuki coupling on a KF-alumina surface: synthesis of polyaryls	<i>Tetrahedron Lett.</i> 2003, 44(19), 3817-3820.
2	Basudeb Basu, Md. M. H. Bhuiyan, <b>Pralay Das</b> , Ismail Hossain	Catalytic transfer reduction of conjugated alkenes and an imine using polymer-supported formats	<i>Tetrahedron Lett.</i> 2003, 44 (50), 8931-8934.
1	Basudeb Basu, Satadru Jha, Md. M. H. Bhuiyan, <b>Pralay Das</b>	A simple protocol for direct reductive amination of aldehydes and ketones using potassium formate and catalytic palladium acetate	<i>Synlett.</i> 2003, 14 (4), 555-557.

### Journals Reviewer

- *Advanced Synthesis & Catalysis – Wiley*
- *Green Chemistry-RSC*
- *The Journal of Organic Chemistry-ACS*
- *Chemistry A European Journal- Wiley*
- *Chemical Communications-RSC*
- *ChemSusChem- Wiley*

- *New Journal of Chemistry-RSC*
- *RSC Advances-RSC*
- *Organic Process Research & Development –ACS*
- *Current Organic Chemistry-Bentham*
- *Journal of Molecular Catalysis A: Chemical – Elsevier*
- *Applied Catalyst A: General – Elsevier*
- *Molecular Diversity – Springer*
- *Catalysis Letters – Springer*
- *Catalysis Communications- Elsevier*
- *Arabian Journal of Chemistry- Elsevier*

## Research Group

### Ph.D. Awarded:

- Dr. Dharminder Sharma, **Thesis title:** “Methodology Development Towards Carbon-Carbon Bond Formation and Their Synthetic Applications”, **2013**, Guru Nanak Dev University, Amritsar, Punjab.
- Dr. Bandna, **Thesis title:** “Exploration of Interface Reagent and Solid Supported Palladium Catalyst for Cross Coupling and Oxidation Reactions”, **2013**, Guru Nanak Dev University, Amritsar, Punjab.
- Dr. Arun Kumar Shil: **Thesis title:** “Development of Solid Supported Palladium(0) and Platinum(0) Nanoparticles as Heterogeneous Catalyst and Their Applications in Reduction and Cross-coupling Reactions”, **2015**, AcSIR, New Delhi.
- Dr. Nitul Ranjan Guha: **Thesis title:** "Studies on solid supported transition metal nanoparticles as heterogeneous catalyst for coupling, reduction and oxidation reactions" **2016**, AcSIR, New Delhi. (Got **Royal Society-SERB Newton International Fellow**, 2016)

### Ph.D. submitted:

- Sandeep Kumar: NET-SRF-UGC

### Research Associate:

- Dr. Abha Chaudhary: CSIR
- Dr. Arun K. Shil

### Present Research Group:

#### Ph.D. Fellow:

- C. Bal Reddy: NET-SRF-UGC (thesis submission under process)

- Richa Bharti: PA-SRF-CSIR (thesis submission under process)
- Vandna Thakur: NET-SRF-UGC
- Dhananjay Bhattacharjee: SRF-CSIR
- Saurabh Sharma: NET-SRF-CSIR
- Shaifali: NET-JRF-UGC
- Nishtha Sharma: PA-CSIR
- Yamini: PA
- Ajay Kumar: PA
- Sankar Ram: CSIR-JRF

#### Former members:

- Manish Kumar: Junior Research Fellow (JRF)-CSIR up to 2009, Present position: PhD scholar US.
- Nidhi Agarwal: RI up to February 2012

#### M. Sc. Project Students/thesis Guided

1. **Manjot Kaur:** Development of polymer stabilized palladium(0) NPs and its application in Suzuki-Miyaura cross coupling reaction, M Tech in Nanotechnology, Sri Guru Granth Sahaib World University, Fatehgarh mSahib, Punjab (1<sup>st</sup> June 2015 to 17<sup>th</sup> July 2015).
2. **Bhupinder Kaur:** Heterogeneous gold nanoparticles: synthesis, characterization and catalytic applications in hydration of nitriles to amides, Sri Guru Granth Sahaib World University, Fatehgarh mSahib, Punjab (1<sup>st</sup> June 2015 to 17<sup>th</sup> July 2015).
3. **Pratibha Sharma:** Microwave assisted green approach for the synthesis of novel  $\beta$ -enaminones and acridinediones, M.Sc. Chemistry, Dr. B.R.Ambedkar National Institute of Technology, Jalandhar (3<sup>rd</sup> June 2013 to 17<sup>th</sup> July 2013).
4. **Ashish Kumar:** Application of heterogeneous palladium catalyst in Suzuki-Miyaura cross coupling reaction using different techniques, Integrated MS (Chemistry), Indian Institute of Science Education and Research (IISER), Mohali(May 15<sup>th</sup> to July 30<sup>th</sup> 2012).
5. **Prateek Sharma:** Development of green process for biologically active cinnamic acid derivatives synthesis through Heck coupling reaction, Master Of Pharmacy, Pharmaceutical Chemistry, Shoolini University, Solan, HP (From 6<sup>th</sup> September 2010 to 11<sup>th</sup> March 2011).
6. **Usha Kondal,** Dr. B.R.Ambedkar NIT, Jalandhar, India.
7. **Sheenam Aery:** Development of methodologies towards synthesis of secondary metabolites, M. Sc. Pharmaceutical Chemistry, Banasthali Vidyapith, Rajasthan (From 5<sup>th</sup> January 2010 to 17<sup>th</sup> June 2010).
8. **Monolina Pal:** Green protocol for aza-Michael reactions: a useful media for natural product synthesis, M. Sc. Pharmaceutical Chemistry, Banasthali Vidyapith, Rajasthan (From 4<sup>th</sup> January 2010 to 17<sup>th</sup> June 2010).

9. **Charu Bhardwaj**: Suzuki-Miyaura cross coupling reaction under different solvent and basic conditions, M.Sc. Chemistry, Dr. B.R. Ambedkar NIT, Jalandhar (From 24<sup>th</sup> May 2010 to 14<sup>th</sup> July 2010).