Dr Vijai K. Rai (Assistant Prof.)

Centre/School/Special Centre: **Physical Science**

Department: **Chemistry**

Phone: **+91-758-717-8627**

Email: **vijaikrai@hotmail.com**

Personal Webpage Link:
https://www.ggu.ac.in/Department-Staff.aspx

Qualifications: Ph. D. from Department of Chemistry, University of Allahabad, U. P. (**2006**)
M. Sc. (72 %) From D. D. U. Gorakhpur University, U. P. India.
B. Sc. (72 %) From D. D. U. Gorakhpur University, U. P. India.

Area of Interest/Specialization: **Synthetic Organic Chemistry/Green Chemistry**

- Heterogeneous Catalysis using nano-materials
- Visible-Light Induced Organic Reactions
- Stereo-controlled Construction of C-C and C-Hetero Bond
- Small & Medium Ring Heterocyclic Syntheses
- Homogeneous Catalysis, Ionic Liquids, Organocatalysis

Experience: **Over 12 Years as Assistant Professor w.e.f. 20. 08. 2009.**

- Assistant Professor at GGV, Bilaspur, C.G. (12th Aug. 2011-Continued).
- Assistant Professor at SMVD University, Jammu (20th Aug. 2009- 9th Aug. 2011).
- Postdoctoral Research Work (1st April 2007-19th Aug. 2009).

Awards and Honors:

1.	Fast Track Young Scientist Award	4th March 2011	**DST, Government of India**, New Delhi, INDIA
2.	Young Scientist Award	10th Feb. 2010	5th J K Science Congress, Jammu, India
3.	**Golden Jubilee Award (NASI)**	21st Nv., 2008	**National Academy of Sciences**, India
4.	D. S. Bhakuni Award	26th Dec., 2007	**Indian Chemical Society**, India
5.	Young Scientist Award	5th Fe., 2007	International Academy of Physical Sciences, India

Research Projects: **Three Completed and One Ongoing Research Projects**

1. Funding Agency: **University Grants Commission (UGC),** New Delhi, India
   Ref No.: F. No. 39-764/2010 (SR)
   Title: *Access to potentially antiviral novel nucleosides using microwave methodology*

2. Funding Agency: **Council of Scientific & Industrial Research (CSIR)**, New Delhi, India
   Ref No.: No. 01 (2442)/10/(EMR-II)
   Title: *Access to novel imino-/thiosugar scaffolds from renewable bioresources*

3. Funding Agency: **Department of Science & Technology (DST),** New Delhi, India
Ref No.: No. SR/FT/CS-99/2010
Title: *NHC-/enamine-iminium catalysis in stereocontrolled construction of bioactive scaffolds*

4. Funding Agency: **SERB, DST, New Delhi**, India
Ref No.: CRG/2021/001162
Title: *Photoredox Catalysis to Access Stereoselective Cascade Reaction*

Best Peer-Reviewed Publication (up to 10):

1. *A novel bioconjugated reduced graphene oxide-based nanocomposite for sensitive electrochemical detection of cadmium in water*
S. R. Bhardiya, A. Asati, H. Sheshma, A. Rai, **Vijai K. Rai**, M. Singh
Sensors & Actuators: B. Chemical, **2021**, *328*, 129019-129028.

2. *Facile Synthesis of γ-Ketonitriles in Water via C(sp2)–H Activation of Aromatic Aldehydes over Cu@g-C_3N_4 under Visible-Light*
Vijai K. Rai, F. Verma, S. R. Bhardiya, H. Sheshma, A. Rai, M. Singh
Eur. J. Org. Chem., **2020**, 5841-5846

3. *Metal-Free C–H Activation over Graphene Oxide Towards Direct Syntheses of Structurally Different Amines and Amides in Water*
P. Shukla, A. Asati, S. R. Bhardiya, M. Singh, **Vijai K. Rai**, A. Rai
J. Org. Chem., **2020**, *85*, 15551-15561.

4. *Cu (I)-Induced Activation of Furan for Inverse Electron Demand ADAR with Alkenes towards Regioselective Synthesis of Tetrahydropyridine*
P. Shukla, A. Asati, S. R. Bhardiya, M. Singh, **Vijai K. Rai**, A. Rai
J. Org. Chem., **2020**, *85*, 7772-7780.

5. *Photocatalytic C(sp^3)–H activation towards α-methylenation of ketones using MeOH as 1C source steering reagent*
F. Verma, P. Shukla, S. R. Bhardiya, M. Singh, A. Rai, **Vijai K. Rai**
Adv. Synth. Catal. **2019**, *361*, 1247-1252.

6. *Visible Light-Induced Direct Conversion of Aldehydes into Nitriles in Aqueous Medium Using Co@g-C_3N_4 as Photocatalyst*
F. Verma, P. Shukla, S. R. Bhardiya, M. Singh, A. Rai, **Vijai K. Rai**
Catalysis Commun. **2019**, *119*, 76-81.

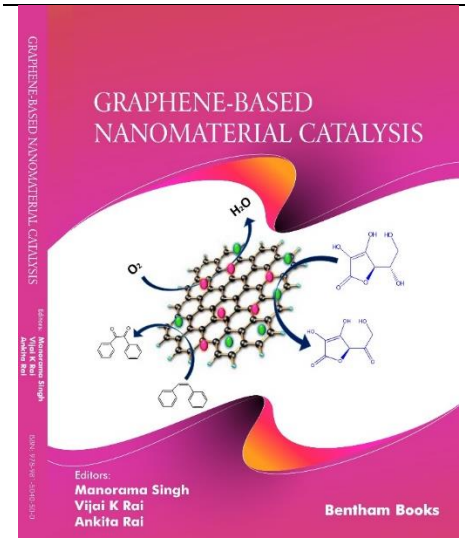
7. *A novel and efficient reduction of graphene oxide using Ocimum sanctum L. leaf extract as an alternative renewable bio-resource*
S. Mahata, A. Sahu, P. Shukla, A. Rai, M. Singh, **Vijai K. Rai**
New J. Chem. **2018**, *42*, 19945-19952.

8. *Visible-light driven regioselective synthesis of 1H-tetrazoles from aldehydes through isocyanide-based [3+2] cycloaddition*
F. Verma, A. Sahu, P. K. Singh, A. Rai, M. Singh, **Vijai K. Rai**
Green Chem. **2018**, *20*, 3783-3789.

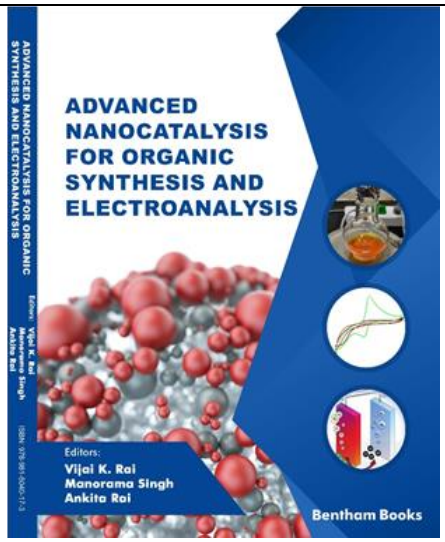
9. *One-Pot Allan–Robinson/Friedländer Route to Chromen-/Quinolin-4-ones through the Domino Acetylative Cyclisation of 2-Hydroxy-/2-Aminobenzaldehyde*
Vijai K. Rai, F. Verma, G. P. Sahu, M. Singh, A. Rai
Eur. J. Org. Chem. **2018**, 537–544.

10. *An unprecedented synthesis of γ-lactams via mercaptoacetylation of aziridines in water*,
Vijai K. Rai, P.K. Rai, S. Bajaj, A. Kumar
Green Chem. **2011**, *13*, 1217-1223.

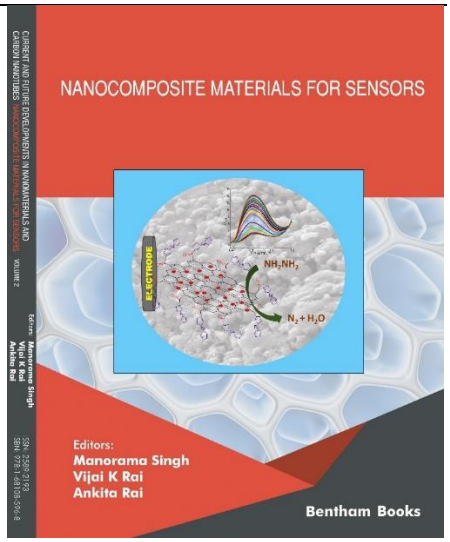
Recent Books/Book Chapters/Monographs etc.: **Published 03 Books**



1. *Graphene-Based Nanomaterial Catalysis*, **2022**
Bentham Science Publishers.
ISBN (online): 978-981-5040-49-4



2. *Advanced Nanocatalysis for Organic Syntheses and Electroanalyses*, **2022**,
Bentham Science Publishers.
ISBN (online): 978-981-5040-16-6



3. *Nanocomposite Materials for Sensors*, **2022**
Bentham Science Publishers.
ISBN (online): 978-1-68108-596-8;
ISSN (online): 2589-2193

Book Chapters (02):

1. ***Role of MOFs as Electro/-Organic Catalysts***
M. Singh, A. Rai, **Vijai K. Rai,** S. R. Bhardiya, A. Asati, Applications of Metal-Organic Frameworks and their derived materials, **2020;** ISBN 978-1-119-65098-0. (Wiley-Scrivener Publishing, Beverly, MA).

2. ***Electrocatalysis: Application of nanocomposite materials***
M. Singh, A. Rai, **Vijai K. Rai,** Methods for Electrocatalysis: Advanced Materials and Allied Applications, **2020;** ISBN 978-3-030-27161-9. (Springer Nature, Switzerland)

Research Supervision:

Two (02) Ph D students have been awarded their Ph. D. degrees under my supervision:

1. **Suhasini Mahata**: Degree awarded on 05 August 2019.
2. **Fooleswar Verma**: Degree awarded on 21 August 2019.

Two (02) Ph D students are working for their Ph. D. degrees and one (01) as JRF in SERB-CRG Project under my supervision:

1. **Ambika Asati**: Date of Registration w.e.f. 20. 05. 2020.
2. **Bhushashi Khunte**: Date of Registration w.e.f. 01. 12. 2021.
3. **Mohar Singh**: Date of Joining as JRF in SERB Project w.e.f. 01. 04. 2022.

Administrative/Other Responsibilities:

- Member of "Incubator Cell"
- Member of Institute Innovation Council at GGV Bilaspur, nominated by HVC.
- Member, Board of Studies, Department of Chemistry, GGV
- Member of the anti-ragging committee.
- Member, Admission Committee, GGV
- Assist Centre Superintendent, University UG & PG Exams, GGV
- Member, Various Departmental Committees
- Member, Organizing conferences/seminars/workshops, GGV
- Member of Discipline Committee.
- Chief Counting Officer of Student-union Election.

Additional Information:

- Editorial Board Member of *Letters in Organic Chemistry*, an International Journal
- Life Member of Indian Science Congress.

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