

Dr. Shailendra Kumar Singh

M.Sc., Ph.D. (Biochemical Engineering)

Assistant Professor and Convenor, Department of Biochemistry

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Google Scholar: scholar.google.com/citations?user=Kx0LKV4AAAAA



RESEARCH PROFILE

Biochemist and biotechnologist with research experience in microalgal and cyanobacterial biotechnology, algal CO₂ sequestration and biofuels, heavy-metal biosorption and bioremediation, and microbial metagenomics. Principal Investigator on five extramural grants totalling ₹109.02 lakh (UGC, DST, DBT, Indo-US Science and Technology Forum and the MIC Scheme), with postdoctoral and visiting research appointments in India, the USA and Japan. Author of 31 research articles, 7 book chapters and 1 book; teaches biochemistry and biotechnology at the undergraduate level.

Publication metrics (Google Scholar): Citations 848 · h-index 14 · i10-index 18 · Cumulative impact factor 68.56

RESEARCH INTERESTS

Microalgal and cyanobacterial biotechnology · Algal CO₂ sequestration and biofuels · Heavy-metal biosorption and bioremediation · Algal nanobiotechnology and biosensors · Microbial metagenomics · Intellectual property rights (IPR)

EDUCATION

Degree	Institution	Period
Ph.D. , Biochemical Engineering — Thesis: <i>Biosorption of heavy metals using <i>Chlorella minutissima</i></i>	Dr. B. R. Ambedkar National Institute of Technology, Jalandhar	2007–2012
M.Sc. , Biochemistry — Thesis: <i>Standardization of simple procedure for early diagnosis of alcoholism in developing countries</i>	Allahabad Agricultural Institute (Deemed University), Allahabad	2002–2004
B.Sc. , Zoology, Botany and Chemistry	University of Allahabad	2000–2002

ACADEMIC APPOINTMENTS

Period	Position and institution	Courses taught
Apr 2023 – present	Assistant Professor and Convenor , Department of Biochemistry, S. S. Khanna Girls' Degree College, Prayagraj, India	Biotechnology, Biochemistry
Aug 2019 – Jun 2021	Visiting Faculty (Biotechnology) , Centre of Food Technology, University of Allahabad, India	Introductory Biotechnology, Biochemistry, IPR
2007–2012	Ph.D. Scholar and Teaching Assistant (AICTE-funded), Dr. B. R. Ambedkar NIT, Jalandhar, India	Environmental Chemistry, Energy Engineering, Fluid Flow

RESEARCH APPOINTMENTS

Period	Position	Institution	Research area
Mar 2020 – Mar 2023	D S Kothari Postdoctoral Fellow (UGC)	Centre of Biotechnology, University of Allahabad, India	Microbial biotechnology
Feb 2017 – Feb 2018	Indo-US Postdoctoral Fellow	Institute of Marine and Environmental Technology (IMET), Baltimore, USA	Microbial metagenomics
Nov 2015 – Feb 2017	DST Young Scientist (SERB)	Biological Sciences, BITS Pilani, Hyderabad, India	Microbial biotechnology

Feb – Mar 2014	DST Visiting Researcher	Cancer Research Center, Tokyo Medical University, Japan	Cancer research, cell culture
Jan 2013 – Jun 2015	DBT Research Associate	Centre of Biotechnology, University of Allahabad, India	Microbial biotechnology
Dec 2004 – Dec 2006	Research Assistant (ICMR-funded study)	Biological Sciences, BITS Pilani, Rajasthan, India	Molecular biology, genetics
Jan – Jun 2004	Research Trainee	Neurobiochemistry, IHBAS, New Delhi, India	Clinical biochemistry
Jun 2003	Research Trainee	Institute of Pathology, New Delhi, India	Cell culture, molecular biology

INDUSTRY AND CONSULTANCY EXPERIENCE

Period	Position	Organisation	Role
Jun 2018 – Jul 2019	Product Consultant	Vijay Exim House, Durga Nagar, Ambala Cantonment, Haryana	Market research, product development
Jul – Oct 2015	Research Associate	xBITS (Xcellence in Bio Innovations & Technologies Pvt. Ltd.), Hyderabad	Product development on antimicrobial resistance
Jan – Nov 2007	Product Specialist	Biotron Healthcare Pvt. Ltd., Chembur, Mumbai, Maharashtra	Product demonstration, customer support

RESEARCH GRANTS (AS PRINCIPAL INVESTIGATOR)

Project	Host institution	Funding agency	Period	₹ lakh
Grant support to innovations on “Algae-based food supplements”	S. S. Khanna Girls’ Degree College, Prayagraj	MIC Scheme, YUKTI Innovation Challenge 2023	2023–2024	3.00
Enhanced algal biomass production for biofuel application coupled with CO ₂ sequestration using chitosan-based carbonic anhydrase nanoparticles	University of Allahabad	University Grants Commission, India	2020–2023	23.00
Exploring the algae–bacteria symbiosis for enhanced photosynthetic biomass production	IMET, Maryland, USA	Indo-US Science and Technology Forum	2017–2018	27.52
Evaluation of promising algal isolates for sustainable biofuel production integrated with CO ₂ sequestration	BITS Pilani, Hyderabad	Department of Science and Technology, India	2015–2017	33.50
An integrated approach to produce biofuel and value-added compounds from algae coupled with CO ₂ sequestration	University of Allahabad	Department of Biotechnology, India	2013–2015	22.00
Total				109.02

PUBLICATIONS

Summary: 31 research articles · 7 book chapters · 1 book. Journal impact factors (IF) are shown in square brackets where available. Your name is shown in bold.

Peer-reviewed journal articles

2026

- SK Singh**, A Sharma, S Sundaram. Integrated algal systems for industrial CO₂ mitigation: advances, challenges, and prospects in environmental biotechnology. *Archives of Microbiology* 208: 210. <https://doi.org/10.1007/s00203-026-04765-1>
- I Akram, B Lal, **SK Singh**, K Siak Foo, R Tiwari, B Srivastava, P Kumar. Integrative approaches to gas hydrate mitigation: from molecular inhibitors to machine learning-based flow assurance. *Periodica Polytechnica Chemical Engineering* 70(1): 124–140. <https://doi.org/10.3311/PPCh.42216>

2025

3. **SK Singh**, A Sharma, S Sundaram. Evaluation of *Chlorella vulgaris* as sensitive, cost-effective, and environmentally sustainable biosensor tools for heavy metal monitoring in aquatic ecosystems. *Environmental Monitoring and Assessment* 197(5): 504. [IF 2.6]
4. A Sharma, **SK Singh**, N Maurya, S Tripathi, S Jaiswal, M Agarwal. Restoration of soil fertility under Cr(VI) and artificial drought conditions by the utilization of plant growth-promoting *Bacillus* spp. SSAU2. *International Microbiology*. [IF 3.2]

2024

5. A Sharma, N Maurya, **SK Singh**, S Sundaram. Investigation on synergetic strategy for the rejuvenation of Cr(VI) contaminated soil using biochar-immobilized bacteria and cyanobacteria consortia. *Journal of Environmental Chemical Engineering* 12(2): 112034. [IF 8.2]
6. A Sharma, **SK Singh**, S Sundaram. Efficient biosequestration of Cr(VI) by *Bacillus* spp. SSAU-2: optimization, mathematical modelling, and plant growth promotion. *Biochemical Engineering Journal* 204: 109186. [IF 3.9]
7. A Sharma, **SK Singh**, A Nath, S Sundaram. Methyl red biodegradation by novel halophilic *Lactiplantibacillus plantarum* SS-AU1 isolated from river Ganges. *International Journal of Environmental Science and Technology*: 1–16. [IF 3.2]
8. A Nath, A Sharma, **SK Singh**, S Sundaram. Bioprospecting of endophytes and PGPRs in artemisinin production for socio-economic advancement. *Current Microbiology* 81(1): 4. [IF 2.6]

2023

9. **SK Singh**, A Sharma, S Srivastava, L Sharma. Crafting the synergistic fusion of algal cultivation with effective industrial CO₂ mitigation. *The Open Biotechnology Journal* 17. [IF 0.6]
10. L Sharma, **SK Singh**, S Sundaram. Morphological and biochemical characterization of cyanobacterial isolates from biological soil crust of Rajasthan, India. *International Journal of Pharmaceutical Sciences and Research* 14(2): 891–897.

2021

11. **SK Singh**, R Kaur, MA Rahman, M Mishra, S Sundaram. Evaluation of potent cyanobacteria species for UV-protecting compound synthesis using bicarbonate-based culture system. *3 Biotech* 11: 1–15. [IF 3.1]
12. R Kaur, **SK Singh**, A Bharadwaj, S Sundaram. Exploring the therapeutic and biomedical potential of silver nanoparticles biosynthesized by phycocyanin extracts from a marine cyanobacteria. *International Journal of Medical Research & Health Sciences* 10(10): 1–17.

2020

13. M Mishra, **SK Singh**, R Shanker, S Sundaram. Design and simulation of diatom-based microcantilever immunobiosensor for the early detection of Karnal bunt. *3 Biotech* 10: 1–13. [IF 3.1]
14. M Mishra, **SK Singh**, A Bhardwaj, L Kumar, MK Singh, S Sundaram. Development of a diatom-based photoluminescent immunosensor for the early detection of Karnal bunt disease of wheat crop. *ACS Omega* 5(14): 8251–8257. [IF 4.1]
15. R Kaur, A Rahman, M Mishra, **SK Singh**, S Sundaram, S Alok. Comparative growth analysis of cyanobacteria from diverse habitats with reference to pigments. *International Journal of Pharmaceutical Sciences and Research* 11(6): 2984–2989.

2019

16. M Mishra, **SK Singh**, A Bhardwaj, A Nath, S Sundaram. Growth analysis and frustule characterization of benthic diatomic isolates for nanotechnological applications. *International Journal of Biotechnology* 2(1).

2018

17. **SK Singh**, SR Major, H Cai, F Chen, RT Hill, Y Li. Draft genome sequences of *Cloacibacterium normanense* IMET F, a microalgal growth-promoting bacterium, and *Aeromonas jandaei* IMET J, a microalgal growth-inhibiting bacterium. *Genome Announcements* 6(24): e00503-18. [IF 2.7] <https://doi.org/10.1128/genomea.00503-18>

2016

18. **SK Singh**, S Sundaram, S Sinha, MA Rahman, S Kapur. Recent advances in CO₂ uptake and fixation mechanism of cyanobacteria and microalgae. *Critical Reviews in Environmental Science and Technology* 46(16): 1297–1323. [IF 13.6]
19. **SK Singh**, A Rahman, K Dixit, A Nath, S Sundaram. Evaluation of promising algal strains for sustainable exploitation coupled with CO₂ fixation. *Environmental Technology* 37(5): 613–622. [IF 2.8]

2015

20. K Dixit, **SK Singh**, A Nath, MA Rahman, S Sundaram. Irradiance effect on microalgae by dual-modulation kinetic fluorometer in terms of quantum yield. *Indian Journal of Natural Sciences* 5(29): 4294–4203.

21. Adinath, **SK Singh**, K Dixit, S Sundaram. Chromium induced alterations in different individual microalga and their consortia. *Indian Journal of Natural Sciences* 6: 32.

2014

22. AK Singh, K Sad, **SK Singh**, S Shivaji. Regulation of gene expression at low temperature: role of cold-inducible promoters. *Microbiology* 160(7): 1291–1296. [IF 2.7]
23. MA Rahman, S Sinha, S Sachan, G Kumar, **SK Singh**, S Sundaram. Analysis of proteins involved in the production of MAAs in two cyanobacteria *Synechocystis* PCC 6803 and *Anabaena cylindrica*. *Bioinformation* 10(7): 449. [IF 0.7]
24. **SK Singh**, K Dixit, S Sundaram. Algal-based CO₂ sequestration technology and global scenario of carbon credit market: a review. *American Journal of Engineering Research* 3(4): 35–37.
25. **SK Singh**, K Dixit, S Sundaram. Effect of acidic and basic pretreatment of wild algal biomass on Cr(VI) biosorption. *Journal of Environmental Science, Toxicology and Food Technology* 8(5): 38–41.

2013

26. **SK Singh**, K Dixit, S Sundaram. Bioengineering of biochemical pathways for enhanced photobiological hydrogen production in algae and cyanobacteria. *International Journal of Biotechnology and Bioengineering Research* 4(5): 511–518.
27. **SK Singh**, A Bansal, MK Jha, R Jain. Production of biodiesel from wastewater grown *Chlorella minutissima*. *Indian Journal of Chemical Technology* 20: 341–345. [IF 1.0]
28. **SK Singh**, A Bansal, MK Jha, A Dey. An integrated approach to remove Cr(VI) using immobilized *Chlorella minutissima* grown in nutrient rich sewage wastewater. *Bioresource Technology* 104: 257–265. [IF 11.4]

2011

29. **SK Singh**, A Bansal, MK Jha, A Dey. Comparative studies on uptake of wastewater nutrients by immobilized cells of *Chlorella minutissima* and dairy waste isolated algae. *Indian Chemical Engineer* 53(4): 211–219. [IF 1.5]
30. **SK Singh**, A Bansal, MK Jha, A Dey. Algae: a promising bioindicator for heavy metal pollution. *Journal of Recent Advances in Science* 1(3): 10–17.

2006

31. DN Mishra, M Bindal, **SK Singh**, SGV Kumar. Spray dried excipient base: a novel technique for the formulation of orally disintegrating tablets. *Chemical and Pharmaceutical Bulletin* 54(1): 99–102. [IF 1.7]

Book

Singh SK, Kishor K, Sundaram S. *Photosynthetic Microorganisms: Mechanism for Carbon Concentration*. SpringerBriefs in Materials. Springer, 2014. ISBN 978-3-319-09122-8.

Book chapters

1. Green synthesis of algal nanoparticles: harnessing nature's biofactories for sustainable nanomaterials. In: *Biogenic Wastes-Enabled Nanomaterial Synthesis*. Springer Nature, 2024.
2. Challenges and opportunities in the application of nanotechnology for sustainable biofuel production. In: *Nanobiotechnology for Sustainable Bioenergy and Biofuel Production*. CRC Press, 2020.
3. Biotechnological exploitation of cyanobacteria and microalgae for bioactive compounds. In: *Biotechnological Production of Bioactive Compounds*. Springer, 2019.
4. Biosynthesis and biotechnological potential of UV-absorbing compounds in microalgae. In: *The Role of Photosynthetic Microbes in Agriculture and Industry*. Nova Science Publishers, USA, 2018, pp. 219–236.
5. Recent advances in the production and purification technology of phycobiliproteins: a sustainable approach. In: *The Role of Photosynthetic Microbes in Agriculture and Industry*. Nova Science Publishers, USA, 2018, pp. 173–194.
6. Algal based CO₂ sequestration technology: a sustainable route for CO₂ mitigation. In: *The Role of Photosynthetic Microbes in Agriculture and Industry*. Nova Science Publishers, USA, 2018, pp. 85–104.
7. Algal bio-hydrogen: prospects and challenges. In: *Recent Advances in Bioenergy Research*. Sardar Swaran Singh National Institute of Renewable Energy, 2012, pp. 194–206.

Genome submissions (NCBI, 2018)

Strain	NCBI accession	Authors
<i>Aeromonas jandaei</i> IMET J	PRCV000000000	Singh SK, Major S, Cai H, Chen F, Hill R, Li Y
<i>Treponema</i> sp. IMET F	PTPZ000000000	Singh SK, Major S, Cai H, Chen F, Hill R, Li Y

INVITED TALKS

1. **Green gold: algae's potential for a sustainable world.** *Ecology vs. Economic Development with special reference to the Ganga Basin (NEED-2023)*, Nehru Gram Bharati (Deemed to be University), 15–21 June 2023.
2. **Emerging technologies in algal biotechnology.** S R Institute of Management and Technology, Lucknow, India, 10–14 August 2020.
3. **Sustainable agricultural technologies.** 12th Indian Agricultural Scientists & Farmers' Congress, ISD College, University of Allahabad, 20–21 February 2010.
4. **Biofuel: present and future trends.** 2nd Algal Biofuel Summit, IARI, New Delhi, 8–10 September 2009.
5. **New equipments and technologies in biotechnology.** 18th National Symposium "Catalysis for Future Fuels", Indian Institute of Petroleum, Dehradun, 16–18 April 2007.

CONFERENCE PRESENTATIONS

1. **SK Singh**, S Sundaram. Evaluation of a sustainable route using cyanobacterial strains for CO₂ mitigation. 23rd Agricultural Scientists and Farmers' Congress, "Role of Eco-Friendly and Resourceful Technologies for Aatm Nirbhar Kisan", 20–21 February 2021. (*Best Oral Presentation*)
2. **SK Singh**, A Joshi, SK Singh, S Kapur. Induction of lipid biosynthesis in algae by nitrogen deprivation conditions for biofuel production. World Congress on Biotechnology, Hyderabad, 15–16 December 2016.
3. **SK Singh**, S Sundaram, A Bansal, S Kapur. Integrated algal technology for sustainable energy and environment. BioKumbh, University of Allahabad, 20–21 February 2016.
4. **SK Singh**, VVS Gargeya, S Kapur. Biochemical conversion, life cycle assessment and challenges of algal bioethanol for sustainable development. National Science Congress, Hyderabad, February 2016.
5. **SK Singh**, K Dixit, S Sundaram. Influence of acidic and basic pretreatment of wild algal biomass on Cr(VI) biosorption. International Conference on Health, Environment and Industrial Biotechnology (BioSangam 2013), MNIT Allahabad, 21–23 November 2013.
6. **SK Singh**, K Dixit, S Sundaram. Bioengineering of biochemical pathways for enhanced photobiological hydrogen production in algae. 2nd International Conference on "Agriculture, Food Technology and Environment – New Approaches" (AFTENA-2013), JNU, New Delhi, 19–20 October 2013.
7. **SK Singh**, RK Sharma, MK Jha, A Bansal. Algal technologies: pioneer of the sustainable world. CHEMCON-2012, Dr. B. R. Ambedkar NIT, Jalandhar, 12–18 December 2012.
8. **NK Verma, SK Singh**. Bioprocess technology: recent advances and opportunities for sustainable development. National Conference on Newer Horizons and Innovations in Biotechnology & Biosciences (NHIBB-2012), FETRBS College, Agra, 7–8 April 2012.
9. **SK Singh**, NK Verma. Algal biofuel production technologies. National Conference on Energy and Environmental Issues related to Chemical Industries (EEChemi-2012), FETRBS College, Agra, 18–19 February 2012.
10. **SK Singh**, MK Jha, A Bansal, A Dey. Algal bio-hydrogen. Recent Advances in Bio-energy Research, Sardar Swaran Singh National Institute of Renewable Energy, Jalandhar, 25–26 November 2011.
11. **SK Singh**, MK Jha, A Bansal, A Dey. Algal technologies: pioneering the sustainable development of energy and environment. National Conference Chemical Constellation "Cheminar", Dr. B. R. Ambedkar NIT, Jalandhar, 20–21 August 2011.
12. **SK Singh**, MK Jha, A Bansal, AP Singh. Carbon credit market and algae-based CO₂ sequestration technology: a review. National Conference on Advances in Chemical Engineering (Achem 2011), Thapar University, Patiala, 27–28 February 2011.
13. **SK Singh**, MK Jha, A Bansal, A Jindal. Exploring algal beads potential for waste water treatments. SCHEMCON 2010, RVR & JC College of Engineering, Guntur, 22–25 September 2010.
14. **SK Singh**, MK Jha, A Bansal, A Jindal. Algal potential for bioremediation and green fuel technology. National Conference on Recent Advances in Green, Eco-Friendly & Sustainable Chemistry, Hans Raj Mahila Maha Vidyalaya, Jalandhar, 9–10 September 2010.
15. **SK Singh**, MK Jha, A Bansal, A Dey. Transforming waste into clean energy: a technological overview. 1st International Conference "New Frontiers in Biofuel", New Delhi, 18–19 January 2010.

FELLOWSHIPS, AWARDS AND HONOURS

Year	Honour
2023	Grant Support to Innovations (₹3 lakh), MIC Scheme, YUKTI Innovation Challenge 2023 (selected among 1,400 participants)
2021	Young Scientist Associate Award 2021 for outstanding contribution in Biochemistry, Bioved Research Institute of Agriculture, Technology & Sciences, Prayagraj
2021	Best Oral Presentation , 23rd Agricultural Scientists and Farmers' Congress (algae-based CO ₂ sequestration technology)
2020–2023	D S Kothari Postdoctoral Fellowship , University Grants Commission (UGC)
2017–2018	Indo-US Postdoctoral Fellowship , IMET, USA, Indo-US Science and Technology Forum
2015–2017	DST Young Scientist Grant , Science and Engineering Research Board (SERB)
2014	Visiting Researcher , Nano-solution Research Laboratory, Tokyo Medical University, Japan (Departmental DST-JSPS project)
2013–2015	DBT Research Associateship , Department of Biotechnology, Government of India
2007–2012	AICTE Doctoral Stipend , Dr. B. R. Ambedkar NIT, Jalandhar
2004	Class Topper (2nd) , M.Sc. Biochemistry, Allahabad Agricultural Institute (Deemed University)
1996	State-level scholarship for meritorious students (High School)

PROFESSIONAL MEMBERSHIPS AND SERVICE

- **Life Member**, Indian Science Congress Association, India
- **Member**, International Society for Applied Phycology, Australia; Bioved Research Society, India
- **Reviewer**: *RSC Advances*; *Journal of Complementary Medicine*; *Algal Research*; *Studies in Natural Products Chemistry* (Elsevier); *Carbohydrate Polymers* (Elsevier); *SpringerBriefs in Materials* (Springer); *Hydrobiologia* (Springer)

TRAINING, WORKSHOPS AND PROFESSIONAL DEVELOPMENT

Year	Programme
2023	Innovation Ambassador, S. S. Khanna Girls' Degree College
2022	Online Refresher Course in Biotechnology, University of Allahabad, 10–23 January 2022
2022	STUTI Programme: hands-on training on advanced material characterization and spectroscopy, BHU, Varanasi
2021	Hands-on training workshop on nanotechnology approach for protein-based therapy development, University of Allahabad
2021	Five-day workshop on NAAC, UGC–Human Resource Development Centre, University of Allahabad, 23–27 August 2021
2021	High-end characterization of micro-algae: overcoming the technological barriers, TERI (The Energy and Resources Institute), 3–4 March 2021
2018	Hands-on training: fabrication and characterization of MOS capacitors, IIT Mumbai
2016	Training programme: molecular techniques to assess microbial community structure and identification, National Bureau of Agriculturally Important Microorganisms, Uttar Pradesh
2016	Winter Institute in Global Health, BITS Hyderabad
2014	Hands-on training: MEMS sensor fabrication, IIT Mumbai
2013	Hands-on training: nanofabrication, IIT Mumbai
2011	Short-term course: Environment Management in Process Industries, Dr. B. R. Ambedkar NIT, Jalandhar, 5–9 June 2011
2010	Hands-on training: algal culturing techniques, Centre for Blue Green Algae, IARI, New Delhi, 7–16 December 2010
2010	Six-month professional training in Patent Law and Drafting, Institute of Patent Attorneys, New Delhi

Patents Filed

1. **Title:** *4M Matrix-Based Biofunctional Nutritional Base for Multiform Functional Food and Nutraceutical Products*
Application No.: 202511113124
Brief Description: The invention relates to a modular, plant–microbe–mineral (4M) matrix designed for developing multifunctional nutraceutical and functional food products with enhanced bioavailability, mineral solubility, and gut compatibility.
2. **Title:** *A Microcantilever Biosensor for Detecting a Biological Pathogen, a Method for Preparing Thereof, and a Method of Detecting a Pathogenic Microorganism in Real Time*
Application No.: 202211075595
Brief Description: The invention describes a highly sensitive microcantilever-based biosensor platform for real-time pathogen detection, integrating nanostructured sensing elements for rapid diagnostics.

Technologies Developed / Prototypes / Process Innovations

1. **Design and Development of Photobioreactor (PBR) Systems**
 - **Laboratory-Scale Vertical Photobioreactor** designed and optimized during doctoral research for wastewater-grown microalgae (*Chlorella* spp.).
 - **Immobilized Algal Cell-Based PBR Configuration** enabling enhanced nutrient uptake and heavy metal (Cr VI) removal from industrial and municipal wastewater.
 - **CO₂ Utilization-Integrated Algal PBR Concept**, coupling flue gas/vehicular CO₂ capture with biomass production for value-added applications (biofuel, feed, nutraceutical precursors).
2. **Algal-Based Biosensing Platforms (Technology Demonstration Level)**
 - Development of **microalgae and cyanobacteria-based biosensing assays** for heavy metal detection in aquatic systems.
 - Demonstrated **biological response-based sensing** (growth inhibition, pigment modulation) as a low-cost environmental monitoring approach.
3. **Biosequestration and Bioremediation Processes**
 - **Cr (VI) biosequestration process** using free and immobilized algal and bacterial systems.
 - **Biochar–microbe–algae consortia** developed for soil and water remediation under heavy metal and drought stress conditions.
4. **Microbial–Algal Consortia Development**
 - Isolation and functional characterization of **algal growth-promoting and inhibitory bacteria**, including genome-level validation.
 - Application of consortia for **enhanced biomass productivity, stress tolerance, and pollutant removal**.
5. **Process-Level Innovations (Pre-Prototype Stage)**
 - **Bicarbonate-based culture systems** for improved cyanobacterial pigment and UV-protective compound production.
 - **Wastewater-driven algal cultivation process** reducing nutrient input cost while enabling simultaneous waste treatment.

Techniques learnt

- ✓ **Molecular Biology:** PCR, SDS-PAGE, Agarose Gel Electrophoresis, ELISA, UV-Spectrophotometer, Isolation of plasmid DNA, Cloning and expression of gene in prokaryotic system, Primer designing etc.
- ✓ **Biochemical Analysis:** Enzyme Assays (Catalase, Peroxidase, Super Oxide Dismutase etc.), Enzyme extraction & immobilization, GC, HPLC, proteins (Bradford/ Lowry's methods), Carbohydrate (Anthrone), lipids (Bligh & Dyer), chlorophyll, pigment, amino acids, Inverted Microscopy, Haematocytometer etc.
- ✓ **Bioenergy:** Hydrogen measurement, Bioethanol, Fermentation, Lipid quantification, Soxhlet extraction. Rotary evaporator, Transesterification, Extraction of oil etc.

- ✓ **Biosensor:** Phirana cleaning, Lithography 1 & 2, Metal Deposition, Sputtering, Antibody Immobilization etc.
- ✓ **Bioinformatics:** Galaxy, NGS Analysis, Phylogenetic, BLAST, FASTA, Phylogenetic analysis etc.
- ✓ **Microbiology:** Algae and Bacterial Isolation, Bacterial inhibition assay, Replica plating Bacteriological water analysis, staining Microscopy, Algal cell culturing, Growth curve analysis etc.
- ✓ **Environmental bioremediation:** Heavy metal analysis, waste water characterization, BOD, COD, TSS, TOC, TN, Nutrient removal, CO₂ sequestration etc.

Community Services

- **CAP Foundation, Allahabad:** - As a **volunteer**, actively provided the carrier counseling in entrepreneur opportunities for unemployed rural youth.
- **Bioved Research Society, Allahabad:** - As a **Scientist**, participated in Farmer Awareness Programme to provide detail information regarding the commercial production of algae to farmers.
- **Hostel No.7, Dr. B. R. Ambedkar National Institute of Technology, Jalandhar:** - During PhD, worked as a **Head, Maintenance Committee** at Hostel No. 7 for 5 Years (2008-2012).
- **Blood Donation Camps:** - Active blood donor in Blood Donation Camps.

Extra-Curricular Activities

- Worked as **Technical Organizer** at S-CHEMCON 2008 Conference at Dept. of Chemical Eng., Dr. B. R. Ambedkar National Institute of Technology, Jalandhar.
- **Won 2nd Prize** in **Inter hostel chess championship 2010** at NIT, Jalandhar.
- **Won Bronze Medal** in **District Taekwondo Championship** at Allahabad, **2001**.

Personal Vitae

Father's Name: Mr. Raja Ram Singh

Mother's Name : Late Shanti Devi

Date of Birth: 16th May1982

Nationality : Indian

Permanent Address: 726, 95C / 11C, Sector 8, Chakniratul, Allahabad (U.P.). 211016.

Références

- ✓ **Prof. Shanthi Sundaram**, Centre for Biotechnology, University of Allahabad, Allahabad-211002, India, E-mail: shanthi.cbt@gmail.com
- ✓ **Dr Ajay Bansal**, Department of Chemical Engineering, Dr. B. R. Ambedkar National Institute of Technology, Jalandhar, Punjab. E-mail: bansala@nitj.ac.in
- ✓ **Prof Yantao Li**, Algal Biotechnology Lab, Institute of Marine and Environmental Technology, University of Maryland, Baltimore, USA.; E-mail; - yantao@umces.edu