# SHUBHAM JAIN

University of British Columbia (UBC), Vancouver, Canada
shubhamj@mail.ubc.ca

## SUMMARY

Materials Engineer specialized in ceramics, construction materials and hazardous waste immobilization with 10+ years of research experience in diverse multidisciplinary projects. Skilled in planning and leading collaborative projects, as lab manager, teaching, training/mentoring new researchers, and supervising lab safety.

## CURRENT RESEARCH POSITION

**Postdoctoral Research Fellow, Civil Engineering Department, The University of British Columbia**
*Supervisor: Professor Nemkumar (Nemy) Banthia* *01.2023-12.2023*

Research: Cement-based/geopolymer composites for bio-corrosion resistance in sewage pipelines

- NSERC Alliance Project (*Industry Partners: Metro Vancouver Group, Metro Testing Group and Avestec)*
- Developing low-carbon materials and their placement technologies as a repair coating, which can cost-effectively prolong the lifespan of sewer infrastructure through enhanced resistance to Microbial Induced Corrosion (MIC)

Editorial work: Assist in the editorial process for the Journal of Cement and Concrete Composites

**Postdoctoral Teaching Fellow, Materials Engineering Department, The University of British Columbia** *01.2023-04.2023*

- Supervision of the undergraduate ceramic labs and mentoring teaching assistants

## EDUCATIONAL QUALIFICATION

**Ph.D., Materials Engineering, The University of British Columbia** *09.2016 – 12.2022*

- Scholarships/award: SERB-UBC doctoral scholarship, J Keith Brimacombe memorial scholarship, John S. Nadeau memorial scholarship, President's academic excellence initiative Ph.D. award
- Sessional average of courses: **91.4%**

**Indian Institute of Technology, Varanasi (IIT BHU, Varanasi)** *2010 - 2015*

B. Tech. + M. Tech. in Ceramic Engineering, GPA: 8.0/10.0, **Ranked 2nd** in graduating class

## Ph.D. RESEARCH EXPERIENCE (Materials Engineering, UBC, Vancouver, Canada)

**Thesis: Fly ash-based geopolymers for immobilization of nuclear waste containing cesium**
*Supervisors: Professor Tom Troczynski and Professor Nemkumar Banthia* *09.2016 - 12.2022*

**Specialization: Ceramics, Sustainable cementitious materials, Leaching, Waste management**

- Investigated the effects of process parameters on the geopolymer's synthesis, microstructure, phase compositions, and cesium immobilization using factorial experimental design and ANOVA
- Studied the kinetics of zeolite crystallization in FA-GP systems and established its relation to Cs immobilization
- Achieved significantly enhanced Cs immobilization via a one-step synthesis and chemical route
- Published two peer-reviewed papers as first and corresponding author in **Journal of Cleaner Production (I.F = 11.07)** and **Journal of cement and concrete composites (I.F = 9.93)** and one book chapter in **Advances in the Toxicity of Construction and Building Materials**

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## INTERNSHIPS AND PROFESSIONAL RESEARCH EXPERIENCE

**JRF, Materials Research Center, Indian Institute of Science (Bangalore, India)** *12.2015 – 05.2016*

- Research 1: Salicylic acid –PCL based biodegradable polymeric implant for cancer therapy and anti-cancer applications
- Research 2: "Development of particulate reinforced boron carbide-based composites for high temperature application" in collaboration with Bhabha Atomic Research Center, India
- Research 3: BrahMos Project; Ultra high temperature ceramics for hypersonic vehicle applications

**M. Tech project and internship, Georgia Institute of Technology (Atlanta, Georgia, U.S.A.)**

- Research 1: Package integrated high density thin capacitors and inductors *01.2015 – 03.2015*
- Research 2: Nanomagnetic composites for antenna application *06.2013 - 07.2013*

**B. Tech and other research projects, Indian Institute of Technology (BHU), Varanasi (India)**

- Research 1: Synthesis of bioactive glass Nano-powers by sol gel process *02.2014 – 09.2014*
- Research 2: Study on Bioactive Glasses *08.2012 – 12.2012*
- Research 3: Commercialization of Solid Oxide Fuel Cells (SOFC's) *12.2011 – 04.2012*

## TECHNICAL SKILL SET

**RESEARCH-RELATED CHARACTERIZATION SKILLS:** Synthesis/casting techniques**,** microstructure and phase characterizations (SEM, XRD), leaching and solution analysis (ICP-OES, ICP-MS), mechanical properties (compressive, tensile etc.) measurements, BET pore-related characterizations (pore volume, size, structure), thermal characterization (DTA/TGA), viscosity measurement, chemical durability etc.
**COMPUTER SKILLS:** Microsoft office, Origin, ImageJ, Design Expert

## TEACHING AND MENTORING

- Postdoctoral teaching fellow for the undergraduate Ceramics lab *Jan 2023-current*
- Mentoring a master's student for the NSERC Alliance Project *Jan 2023-current*
- Teaching assistant in the MTRL 382: Ceramics lab with 300+ students, UBC *2017-2022*
- Mentored 21 senior-level undergraduate students for Capstone design project, UBC *2020-2021*
- Trained and mentored 3 summer students, UBC *2018-2020*
- Guest lectured on "Geopolymers" as an invited speaker for the CIVL 529 course, UBC *2021-2022*

## MANAGEMENT AND EXTRACURRICULAR

- Lab manager of UBCeram group (Ceramics lab) group, UBC *2018-2022*
- Member of multidisciplinary research groups UBCeram (Materials) and SIERA (Civil) *2018-2022*
- Member of the local safety team (LST), Materials Engineering, UBC *2018-2022*
- Vice-president of the Joint student chapter, Materials Engineering, UBC *2017-2018*
- Member of Graduate Student Society (GSS), UBC *2017-2018*
- Volunteer, Environmental team at VMFF, Hindi samiti and Open day at IISc *2015-2018*

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## SELECTED ACADEMIC ACHIEVEMENTS

- Recipient of **Science and Engineering Research Board overseas doctoral fellowship**, UBC, 2016-2021
- Recipient of **J Keith Brimacombe Memorial Scholarship awarded** for the most exceptional graduate research work in the **Materials Engineering Department**, UBC, 2020
- Recipient of **John S. Nadeau memorial scholarship** awarded for research excellence with exceptional service to graduate student community in the Materials Engineering Department, UBC, 2018
- Won **3rd prize** at the student award competition, **American Concrete Institute (ACI)**, British Columbia Chapter (2020) and **METSOC** (2017)
- Rated in the **top 10% student bracket** for the research work at **Indian Institute of Science, Bangalore,** 2016
- Recruited by **Board of Research in Nuclear Science (BRNS), India** as **Junior research fellow** for nuclear reactor related project, 2016
- Assisted **BrahMos Aerospace Private Limited** (India Russia Joint Venture) mentors for the collaborated project work at **IISc,** 2015-16
- Received an overall intern rating of **A+** for the **M.Tech project** at **Georgia Institute of Technology, US** for **outstanding** performance, 2015
- Secured **excellent 'S' grade (Perfect 10)** in the **M.Tech and B.Tech projects**, IIT (BHU), 2014-2015
- Received **Ministry of Human Resource Development Scholarships** (India) for securing AIR 290 in Graduate Aptitude Test Examination (**GATE**), 2014
- Ranked amongst top 1.2% in **IIT-JEE** and top 1.3% in **All India Engineering Entrance Examination** among over 500,000 students, 2010

## PUBLICATIONS AND POSTERS

- Peer review article **"Conditioning of simulated cesium radionuclides in NaOH-activated fly ash-based geopolymers"** published in **Journal of Cleaner Production (I.F = 11.07),** as a **first and corresponding author**, **DOI: 10.1016/j.jclepro.2022.134984**, 2022
- Published peer review article **"Leaching of immobilized cesium from NaOH-activated fly ash-based geopolymers"** in **Journal of cement and concrete composites (I.F = 9.93),** as a **first and corresponding author**, **https://doi.org/10.1016/j.cemconcomp.2022.104679**, 2022
- **Co-author** of book chapter named **"Leaching of concrete with mine tailings"** in book: Advances in the toxicity of construction and building materials, pp.537-588 at **the University of British Columbia, Vancouver, BC, Canada (ISBN: 978-0-12-824533-0),** 2022
- Presented the research work **"Processing and characterization of fly ash geopolymers for encapsulation of nuclear waste containing cesium"** as an invited speaker in **14th Pacific Rim Conference on Ceramic and Glass Technology**, 2021
- Presented the research work **"Fly ash geopolymers for Cesium containing waste immobilization"** in **Materials Engineering Research Conference (MERC)**, 2019
- **Won 3rd prize** as a co-author for the poster **"Process development for fast setting geopolymers"** at the **56th Annual COM conference, METSOC,** 2017
- **"Modulated in Vitro Biocompatibility of a Unique Cross-Linked Salicylic Acid–Poly (ε-caprolactone)-Based Biodegradable Polymer"** research article is published in peer reviewed **ACS applied materials and interfaces international journal (I.F = 10.38) (DOI: 10.1021/acsami.6b10711),** 2016

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- **"Ultra-thin substrate-integrated self-healing nanocapacitors with low-leakage currents and high-operating frequencies"** is published in peer reviewed **IEEE, Transactions on Components, Packaging, and Manufacturing Tech.** international journal **(DOI: 10.1109/TCPMT.2016.2602213)**, 2016 (**I.F = 1.73**)
- **Co-author** of book chapter named **"Embedded Passives"** in book: Materials for Advanced Packaging, pp.537-588 at School of Electrical and Computer Engineering**, Georgia Institute of Technology, Atlanta, GA 30332, USA (DOI: 10.1007/978-3-319-45098-8_13)**, 2016
- Presented the poster **"Potential of Aluminosilicate Geo-Polymer cements towards green building and sustainable urban development"** as the first author in **Pacific Centre for Advanced Materials and Microstructures (PCAMM)** conference, Vancouver, 2016
- Co-authored for the poster **"Setting rate limiting step in alumino-silicate geopolymers" in PCAMM conference**, Vancouver, 2016
- **"Influence of barium substitution on bioactivity, thermal and physico-mechanical properties of bioactive glass"** is published online in peer reviewed **MSE C international journal (I.F = 7.33) (http://www.sciencedirect.com/science/article/pii/S0928493115000594), 2015**
- **"Magnetic and Dielectric Property Studies in Fe- and NiFe-Based Polymer Nanocomposites"** is accepted in peer reviewed **Journal of Electronic Materials (I.F = 1.93)** and published online **(http://link.springer.com/article/10.1007%2Fs11664-015-3801-x), 2015**
- **Won 1st prize** at 77th Annual Conference of Indian Ceramic Society for paper presentation, (2013)— Studies on in vitro Bioactivity of SIC / Bioactive Glass Composite

## RELEVANT COURSE WORK

Hydrometallurgy I, Condition Assessment and Rehabilitation of Civil Infrastructure, Fundamental of Ceramic Processing, Nanotechnology, Materials Science, Glass Technology and Bio ceramics, Electro Ceramics, Industrial Economics and Factory management, Advanced Techniques for material characterization and Refractories