
Md Hasibul Hasan ‘Rahat’

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[Google Scholar](#), [ResearchGate](#)

EDUCATION

PhD in Civil Engineering (2025)

Virginia Tech, Blacksburg, VA, USA

Supervisor: Dr. Alexander S. Brand

Dissertation: “Durability of cementitious materials in arctic regions: Investigating the freeze/thaw and chloride ingress damage mechanism.”

MEng in Materials Science and Engineering (2025)

Virginia Tech, Blacksburg, VA, USA

Supervisor: Dr. Alexander S. Brand

M.Sc. in Construction Management (2022)

East Carolina University (ECU) Greenville, NC, USA

Supervisors: Dr. Carol C. Massarra and Dr. George C. Wang

Thesis: “A Process for Utilizing Disposable Face Masks in Hot Mix Asphalt (HMA) Pavement Construction”

MBA in Human Resource Management (2020)

University of Dhaka (DU), Dhaka, Bangladesh.

Thesis: “An Assessment of Faculty Satisfaction of a Private University”

B.Sc. in Civil Engineering (2017)

Ahsanullah University of Science and Technology (AUST), Dhaka, Bangladesh.

Thesis: “Numerical Analysis of High-Rise RCC Buildings with Shear Walls Having Opening of Different Shapes”

RESEARCH AND ACADEMIC EXPERIENCE

1. Postdoctoral Fellow, Department of Structural Engineering, Norwegian University of Science and Technology (NTNU) (August 2025 – Present)

- i. Postdoctoral Fellow at NTNU focusing on frost durability and low-temperature transport in cementitious materials, collaborating with VT, ORNL, and NDEA. Responsibilities include laboratory review and optimization for concrete proportioning, casting, frost testing, freezing dilatometry, and DVS-based pore structure analysis; 2D/3D image analysis of air voids; supervision of MSc research on fibers and air-entrainment (specimen preparation, CT scanning, DIC, frost and

impact testing); and reviewing/updating teaching materials for TKT4215 Concrete Technology.

Skilled in advanced durability testing, microstructural characterization, and interdisciplinary research for improved concrete performance.

2. Graduate Research Assistant (GRA), Virginia Polytechnic and State University (VTech)

(August 2022 – July 2025)

Sustainability and Resiliency of Concrete Structures in Arctic Environments

- i. Engaged in the “**Defense Resiliency Platform (DRP)**” project funded by the U.S. Army Corps of Engineers, focusing on enhancing concrete durability in extreme Arctic environments.
- ii. **Conducted freeze/thaw testing** (ASTM C666) across various conditions, including water, simulated seawater, and other Arctic-representative aqueous solutions such as groundwater.
- iii. **Quantified freeze/thaw and chloride ingress damage** using advanced non-destructive methods, including Transmission X-ray Microscopy (TXM) and Magnetic Resonance Imaging (MRI).
- iv. Acquired proficiency in multiple **Non-Destructive Techniques (NDT)**, such as Raman Microscopy, X-ray Diffraction (XRD), and X-ray Fluorescence (XRF), for characterizing concrete performance in Arctic conditions.
- v. Developed a **Transmission X-ray Microscope (TXM)** to measure chloride diffusion coefficients in concrete non-destructively.
- vi. Conducted research on integrating **waste materials as supplementary cementitious materials (SCMs)** to reduce the carbon footprint of concrete production.
- vii. **Investigated structural concrete design for Arctic applications**, with a specific focus on the impacts of repeated freeze/thaw cycles. This research includes examining Arctic structures that are increasingly exposed to thawing and seawater due to climate change and sea level rise.
- viii. Explored the effects of **cellulose nanofiber gels** on enhancing chloride resistance and freeze/thaw durability in cementitious pastes.
- ix. Investigated “**Real-Time Monitoring of Bulk Water Movement** within the Microstructure of Portland Cement Concrete Exposed to Subzero Temperatures Using Neutron Radiography” at **MARS Beamline Oakridge National Laboratory** as PI.
- x. Simulated **hydration kinetics using CEMGem** web-based software to predict early-age elastic moduli of various concrete mixes, incorporating supplementary cementitious materials (SCMs), across different water-to-cementitious ratios and curing temperatures.
- xi. Conducted field investigation in Alaska to evaluate potential durability issues in 60-year-old DOT bridges, assessing damage and identifying failure mechanisms.

3. Graduate Research Assistant (GRA), East Carolina University (ECU)

(February 2021 –June 2022)

A Process for Utilizing Disposable Face Masks in Hot Mix Asphalt (HMA) Pavement Construction

- i. Conducted research on recycling waste materials for construction applications, especially the **COVID-19 face masks** to use as a modifier of hot mix asphalt pavement. Conducted research on

developing a safe collection method, cost estimation calculator, and Life cycle cost analysis for using used facemasks in asphalt pavement construction and researched using industrial by-products (i.e., steel slag) to improve the performance of the hot mix asphalt pavement.

RESEARCH INTERESTS

1. The durability and fracture properties of concrete constructed with recycled aggregates (i.e., reclaimed asphalt pavement, recycled concrete aggregates, lag aggregates) and with supplementary cementitious materials (SCMs) (i.e., fly ash, biochar, cellulose nanofibers, nanoparticles, ground granulated blast furnace slag, silica fume, rice husk ash).
2. Cement chemistry, hydration kinetics, cementitious materials characterization using advanced techniques (i.e., Neutron imaging/diffraction, x-ray diffraction, x-ray fluorescence, transmission x-ray microscopy, scanning electron microscopy, Raman microscopy, LT-DSC, SEM, TEM, Thermogravimetric analysis).
3. Sustainable pavement materials: using recycled waste materials in concrete and asphalt pavement construction, and life cycle cost analyses of different recycled material modified pavement structures.
4. Development of sensors and Non-Destructive techniques to monitor the health of structure
5. Additive Manufacturing and 3D Printing of Cementitious Materials for Construction Applications. Integration of Artificial Intelligence in predicting the durability of concrete infrastructure

AWARDS

1. Recipient of the prestigious [ACI Foundation Fellowship](#) (2025).
2. Recipient of "**Best Paper Award**" in the Second International Conference on Construction Materials and Structures (ICCMS-2022) for the paper **M., Rahat, H.H., Annand, D., Brand, A.S., Atwood, P.** (2023). "Effect of freeze-thaw and substrate moisture condition on the concrete repair-substrate interface," Second International Conference on Construction Materials and Structures (ICCMS 2022).
3. Recipient of "**Best Graduate International Student Award**" for 2021 at East Carolina University, Greenville, North Carolina.

RESEARCH PUBLICATIONS

Journals Publications

1. **Rahat, M.H.H.** & Brand, A.S. (2025). The combined impact of freeze-thaw cycles and seawater on chloride ingress in concrete. *Construction and Building Materials*. Volume 489, 2025, 142363, ISSN 0950-0618, <https://doi.org/10.1016/j.conbuildmat.2025.142363>.
2. **Rahat, M.H.H.,** Tran, T.Q., Banik, D., & Brand, A.S. (2025). Effects of polyvinyl alcohol fibers and curing duration on chloride ingress in concrete during freeze-thaw cycles, *Journal of Building Engineering*, 2025, 112930, ISSN 2352-7102, <https://doi.org/10.1016/j.jobbe.2025.112930>.
3. **Rahat, M.H.H.,** Gunarathne, K., Carnes, T.S., Hsiao, B.S., & Brand, A.S. (2025). Effect of Cellulose Nanofiber Gels on the Chloride Ingress and Freeze/Thaw Properties of Cementitious Paste.

Construction and Building Materials. 472, 2025, 140997.

<https://doi.org/10.1016/j.conbuildmat.2025.140997>

4. **Md.Hasibul Hasan Rahat**, James R. Torres, Yuxuan Zhang, Sepehr Akhtarshenas, Dip Banik, Sherif L. Abdelaziz, Stefan Jacobsen, Alexander S. Brand, In-situ neutron radiography of pore-water movement in portland cement mortar under subzero temperature exposure: Insights from D2O-H2O systems, *Journal of Building Engineering*, 2025, 114156, ISSN 2352-7102, <https://doi.org/10.1016/j.jobbe.2025.114156>.
5. **Rahat, M.H.H.**, Davis, J., & Brand, A.S. (2025). The Impact of Water-to-Cement Ratios on the Durability and Performance of Concrete Repair-Substrate Interfaces. *Journal of Building Engineering* (**Accepted**)
6. Tran, T.Q., S. Li, B. Ji, X. Zhao, **M.H.H. Rahat**, T.-N. Nguyen, B.-C. Le, W. Zhang, and A.S. Brand (2024). "Mitigation of zinc and organic carbon leached from end-of-life tire rubber in cementitious composites," *Construction and Building Materials*, 432, 2024, 136589. DOI: <https://doi.org/10.1016/j.conbuildmat.2024.136589>
7. Thien Q. Tran, Bilin Tong, Shiyu Li, Bin Ji, **Md Hasibul Hasan Rahat**, Wencai Zhang, Gerardo W. Flintsch, Alexander S. Brand. "Zinc and total organic carbon leachability from end-of-life tire rubber in rubberized asphalt concrete", *Road Materials and Pavement* <https://doi.org/10.1080/14680629.2025.2497518>.
8. Massarra, C.C., **M., Rahat, H.H.**, Wang, G. (2022). Evaluating the cost of collection, processing, and application of face masks in hot-mix asphalt (HMA) pavements. *Heliyon*. <https://doi.org/10.1016/j.heliyon.2022.e11239>
9. Wang, G., Li, J., Saberian, M., **Rahat, M. H.**, Massarra, C., Buckhalter, C., Farrington, J., Collins, T., & Johnson, J. (2022). Use of COVID-19 single-use face masks to improve the rutting resistance of Asphalt Pavement. *Science of The Total Environment*, 154118. <https://doi.org/10.1016/j.scitotenv.2022.154118>
10. **Rahat, M. H. H.**, Karmakar, A., & Madani, M. A. U. Z. (2022). THE EFFECT OF STEEL SLAG POWDER ON HMA STABILITY. *Malaysian Journal of Civil Engineering*, 34(2), 37-43. <https://doi.org/10.11113/mjce.v34.18383>

Conference/Seminar/ Paper

1. **Rahat, M. H. H.**, Annand, D. M., & Brand, A. S. (2024). Effect of Freeze Thaw and Substrate Moisture Condition on the Concrete Repair-Substrate Interface. *Proceedings of the International Conference on Concrete Pavements*, 13(1), 412-427. <https://doi.org/10.33593/vabb8064>
2. **Rahat, M. H. H.**, Tran, T. Q., Love, B. D., Behravan, A., & Brand, A. S. (2024). Investigating the Impact of Freeze-Thaw Damage on Chloride Ingress in Concrete. In *Cold Regions Engineering 2024: Sustainable and Resilient Engineering Solutions for Changing Cold Regions* (pp. 575-585). <https://doi.org/10.1061/9780784485460.053>

3. **Rahat, M.H.H.**, Jacobsen, S., Abdelaziz, S.L., & Brand, A.S. (2025). Real-Time Monitoring of Bulk Water Movement in Subzero-Exposed Portland Cement Concrete Microstructure Using Neutron Radiography. In *15th Advances in Cement-Based Materials, CU Boulder, Boulder, CO*.
4. **Rahat, M.H.H.**, & Brand, A.S. (2024). Effect of Cellulose Nano-Fiber Gels on the Chloride Ingress and Freeze/Thaw Properties of Cementitious Paste. In *14th Advances in Cement-Based Materials, Missouri S&T, Rolla*.
5. **Rahat, M. H. H.**, Annand, D., Atwood, P., & Brand, A. S. Synergistic effect of freeze/thaw cycle and seawater on chloride ingress in concrete. In *13th International Conference on Concrete Pavements | Minneapolis, Minnesota, USA*.
6. **M., Rahat, H.H.**, Massarra, C.C., Wang, G. (2023). “A Safe Collection Process of Covid-19 Disposable Face Masks for the Applications in Asphalt Pavements”, *59th Annual Associated Schools of Construction International Conference, Liverpool, United Kingdom*.
7. **M., Rahat, H.H.**, Massarra, C.C., Wang, G. (2022). “Using Plastic Wastes in Construction: Opportunities and Challenges”, *58th Annual Associated Schools of Construction International Conference, Atlanta, GA, United States*.
8. **Rahat, M. H. H.**, Annand, D., Atwood, P., & Brand, A. S. Effect of Freeze/Thaw and Substrate Moisture Condition on the Concrete Repair-Substrate Interface. In *13th International Conference on Concrete Pavements | Minneapolis, Minnesota, USA*.
9. **Rahat, M. H. H.**, Tran, T. Q., Love, B. D., Behravan, A., & Brand, A. S. Investigating the Impact of Freeze–Thaw Damage on Chloride Ingress in Concrete. In *Cold Regions Engineering 2024: Sustainable and Resilient Engineering Solutions for Changing Cold Regions* (pp. 575-585).
10. **M., Rahat, H.H.**, Brand, A.S. (2023). “Damage mechanisms of Concrete due to Freeze/Thaw actions in arctic concrete”, 4th Quarterly Meeting of Defense Resiliency Platform System, UCSB, Santabarbara, CA, USA.
11. **M., Rahat, H.H.**, Brand, A.S. (2023). “Damage mechanisms of Concrete due to Freeze/Thaw actions in arctic concrete”, 3rd Quarterly Meeting of Defense Resiliency Platform System, CRREL, NH, USA.
12. **M., Rahat, H.H.**, Brand, A.S. (2023). “Damage mechanisms of Concrete due to Freeze/Thaw actions in arctic concrete”, 2nd Quarterly Meeting of Defense Resiliency Platform System, MCAD, Minneapolis, MN, USA.
13. **M., Rahat, H.H.**, Brand, A.S. (2023). “Damage mechanisms of Concrete due to Freeze/Thaw actions in arctic concrete”, 1st Quarterly Meeting of Defense Resiliency Platform System, Stony Brook University, Long Island, NY, USA.
14. **M., Rahat, H.H.**, Brand, A.S. (2022). “Concrete Sustainability in Arctic Environment”, 3rd Quarterly Meeting of Defense Resiliency Platform System, Virginia Tech, Blacksburg, VA, USA.
15. **M., Rahat, H.H.**, Massarra, C.C., Wang, G. (2023). “A Safe Collection Process of Covid-19 Disposable Face Masks for the Applications in Asphalt Pavements”, *59th Annual Associated Schools of Construction International Conference, Liverpool, United Kingdom*.

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16. **M., Rahat, H.H.**, Annand, D., Brand, A.S., Atwood, P. (2023). “Effect of freeze thaw and substrate moisture condition on the concrete repair-substrate interface”, Second International Conference on Construction Materials and Structures (ICCMS 2022).
 17. **M., Rahat, H.H.**, Massarra, C.C., Wang, G. (2022). “Using Plastic Wastes in Construction: Opportunities and Challenges”, 58th Annual Associated Schools of Construction International Conference, Atlanta, GA, United States.
 18. Presented a poster presentation at ECU Construction Management Lab titled, “**Convert Single-Use Mask to a modifier to Improve Asphalt Pavement Rutting Resistance**”
 19. **M., Rahat, H.H.**, Massarra, C.C., Wang, G., Farrington, Jodi, (2022). “Convert Single-Use Mask to a Modifier to Improve Asphalt Pavement Rutting Resistance”, RCAW week in East Carolina University, Greenville, NC, United States.
 20. **M., Rahat, H.H.**, Massarra, C.C., Wang, G., Farrington, Jodi, (2022). “A Collection Process and Cost Estimating Calculator for Applications of Disposable Face Masks in Asphalt Pavements”, International Scholar’s Symposium by East Carolina University RCAW, Greenville, NC, United States.
 21. Wang, G., Li, J., Li, W., **Rahat, M.** (2021). Blending use – maximize the benefit from using recycled materials in construction. *International Conferences on Resource Sustainability (icRS)*, University College Dublin, Ireland, *icrs2021dublin.ucd.ie*. Submission ID: 153, 4:45-5:00 PM July 19-23, 2021.

Works Under Review

1. Cho, S.W., Cho, S.E., **Rahat, M.H.H.**, & Brand, A.S. (2025). Synergistic Effects of Fly Ash and Quarry By-Products in Concrete: Advancing Sustainable Construction Practices (under preparation)
2. Tong, B., Brand, A.S., **Rahat, M.H.H.**, & Flintsch, G. (2025). Design and Shrinkage Consideration of Cement-Treated Full-Depth Reclamation Materials with Accelerated Pavement Testing (Under review in TRB)

Patent Disclosure Under Review

1. **Rahat, M.H.H.**, Gunarathne, K., Hsiao, B.S., & Brand, A.S. (2024). “*Nitro-Oxidized Nanocelluloses as Property Enhancing Additives for Cementitious Paste*”. Inventor Portal Reference #: IPR 25 032 (Under Review)

PROJECTS INVOLVED

- i. Improvement of Airfield Concrete Pavement for the Norwegian Defense Estate Agency, Funding Source: **Norwegian Defense Estate Agency (NDEA)**
- ii. Development of a defense resiliency platform in arctic regions. Funding source: **Cold Regions Research and Engineering Laboratory (ERDC-CRREL)**, \$17,000,000; PI: Sherif L Abdelaziz
- iii. 3D Printing concrete for an affordable home in Virginia. Funding source: **Virginia Housing**, \$1,100,000; PI: Alexander S. Brand
- iv. Utilization and Beneficiation of Virginian Quarry Fines for Concrete Materials. Funding source: **4 VA institutions**, \$25,000; PI: Alexander S. Brand

RESEARCH PROPOSAL WRITING EXPERIENCE

Beamline Proposal Writing Experience

PI: Md Hasibul Hasan Rahat; Co-PIs: Alexander S. Brand, Sherif Abdelaziz, Stefan Jacobsen

Proposal Title: Real-Time Monitoring of Bulk Water Movement in Subzero-Exposed Portland Cement Concrete Microstructure Using Neutron Radiography

- i. MARS Beamline (CG-1D), ORNL – IPTS 32819.1 Submitted and secured beam time to investigate freeze-thaw-induced water migration in concrete using cold neutron radiography.
- ii. VENUS Beamline (BL-10), ORNL – IPTS 34942.1. A follow-up proposal was submitted to address beam-hardening effects and enable higher-resolution imaging with thicker concrete samples under subzero conditions.

FIELD TRIPS

- i. Conducted inspection on 32 years marine exposed 17 concrete beams at Trondheim Norway.
- ii. Participated in a geophysical field campaign in Fairbanks, AK (May 2023), to assess permafrost depth during summer conditions using S-wave and Rayleigh wave dispersion analysis, along with ground-penetrating radar (GPR), near the Arctic Circle.
- iii. Conducted a winter field investigation in Fairbanks, AK (January 2024), employing S-wave and Rayleigh wave techniques and GPR to evaluate seasonal variations in permafrost depth near the Arctic Circle.
- iv. Engaged in a field expedition to Nome, AK (September 2024), for structural assessment of 60-year-old Alaska DOT bridges and collection of non-destructive testing (NDT) data, including permafrost profiling near the Arctic Circle.

PROFESSIONAL SERVICES: REVIEWER

1. Construction and Building Materials (Reviewed 1 journal article)
2. ASCE-Journal of Materials in Civil Engineering (Reviewed 1 journal article)
3. European Journal of Civil Engineering (Reviewed 1 journal article)
4. International Journal of Pavement Engineering, Taylor and Francis (Reviewed 11 journal articles)
5. Road Materials and Pavement Design, Taylor and Francis (Reviewed 1 journal article)
6. ASCE-Journal of Materials in Civil Engineering (JAMCE) (Reviewed 1 article)
7. International Journal of Pavement Research and Technology, Springer Nature (Reviewed 2 journal articles)
8. Journal of Architectural Design and Construction Technology (Reviewed 1 article)
9. Materials Today: Proceedings, Elsevier (Reviewed 5 journal articles)
10. 59th International Conference of Associated School of Construction (ASC), 2023 (Reviewed 1 article)
11. Malaysian Journal of Civil Engineering (MJCE) (Reviewed 1 journal article)
12. IUT JOURNAL OF ENGINEERING AND TECHNOLOGY (JET) (Reviewed 1 journal article)

MENTORSHIP AND SUPERVISED STUDENTS

Mentorship and Supervised Graduate Student

1. Jonas Naujokat (Co-supervisor) (MSc. in Structural Engineering, NTNU-Fall 2025)

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2. Douglas Annand (MSc in Civil Engineering, Virginia Tech-Spring 2023, Current Position: Electric Transmission Engineer, Dominion Energy)
 3. Mohammad Owais (MSc in Civil Engineering, Virginia Tech- Fall 2023, Current Position: Structural Engineer, WSP USA)
 4. Tu-Nam Nguyen (MSc in Civil Engineering, Virginia Tech- Fall 2023, Current Position: PhD student at Georgia Tech)
 5. Ellis Kristen (MSc in Civil Engineering, Virginia Tech- Spring 2025)
 6. Erika Mae Buela (MSc in Civil Engineering, Virginia Tech- Spring 2025)

Supervised Undergraduate Student

1. Brendan DJE Love (Major in Electrical and Communication Engineering at Virginia Tech), project:
 - i. “Real-Time Monitoring of Bulk Water Movement in Subzero-Exposed Portland Cement Concrete Microstructure Using Neutron Radiography”
 - ii. “Investigating the Impact of Freeze-Thaw Damage on Chloride Ingress in Concrete”
2. Janelle Davis (Major in Aerospace Engineering at Virginia Tech), project:
 - i. “The Impact of Water-to-Cement Ratios on the Durability and Performance of Concrete Repair-Substrate Interfaces.”
3. Zoe Koperna, Robert Huie, Cole Harsa (Major in Materials Science and Engineering at Virginia Tech), Project:
 - i. “The impact of calcium aluminate cement in hydration kinetics and mechanical performance of concrete.”
4. Md. Tauhid Islam (Major in Civil Engineering, University of Global Village (UGV), Barishal, Bangladesh)
 - i. “Synergistic impacts of waste rubber and GI fibers in improving concrete’s mechanical properties.”

TEACHING EXPERIENCE

1. **Lecturer, Bangladesh University (BU) (2019 - 2021)**

Taught Courses:

- i. Structure I (Rating 4.87/5-Fall 2019, Fall 2020)
- ii. Structure II (Rating 4.5/5-Fall 2019, Fall 2020)
- iii. Structure III (Rating 4.73/5-Fall 2019, Fall 2020)
- iv. Concrete Materials (Rating 4.91/5 Spring-2020, Spring-2021)
- v. Structure IV (Rating 4.61/5 Spring-2020, Spring-2021)
- vi. Structure V (Rating 4.90/5 Spring-2020, Spring-2021)
- vii. Structure VI (Rating 4.40/5 Spring-2020)

2. **Lecturer (Adjunct), BRAC University (BRACU) (2019 - 2021)**

Taught Courses:

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- i. Concrete Materials (Spring-2020, Fall-2020)
 - ii. Structure IV (Spring-2020, Spring-2021)
 - iii. Structure II (Fall 2019, Fall 2020)
 - iv. Structure III (Fall 2019, Fall 2020)

3. Lecturer (Adjunct), Presidency University (PU), Dhaka (2019 - 2021)

Taught Courses:

- i. Design of Concrete Structures-I (Spring-2020, Fall-2020)
- ii. Design of Concrete Structures-II (Spring-2020, Spring-2021)
- iii. Structural Analysis & Design-I (Fall 2019, Fall 2020)
- iv. Structural Analysis & Design-II (Fall 2019, Fall 2020)
- v. Transportation Engineering I (Fall 2020)

4. Teaching Assistant (TA), Virginia Tech (2022-2025)

Taught Courses:

- i. CEE 4614/5664-Advanced Concrete Materials (Spring 2023, Spring 2024, Spring 2025)

5. Teaching Assistant (TA), Islamic University of Technology (IUT), OIC, Dhaka. (2018-2019)

Taught Courses:

- ii. Advanced Concrete Materials
- iii. Engineering Materials
- iv. Design of Concrete Structures Lab
- v. Plumbing Services

Equipment Skills

1. **Neutron Radiography/Tomography:** This technique, due to its sensitivity to hydrogen, enables real-time imaging of water movement and freeze-thaw processes within concrete.
2. **Particle Size Analyzer (PSA):** This device measures particle size distribution, which is crucial for understanding material compaction and strength characteristics.
3. **Raman Microscopy:** Provides molecular insights into concrete materials' composition and chemical bonds.
4. **X-ray Diffraction (XRD):** Identifies crystalline phases, aiding in understanding hydration products and material composition.
5. **Scanning Electron Microscopy (SEM):** Offers detailed surface morphology and microstructure analysis.
6. **Transmission X-ray Microscopy (TXM):** Non-destructive technique used to visualize high resolution chloride ingress and microstructural features.
7. **Differential Scanning Calorimetry (DSC):** Measures thermal transitions, such as freezing and melting points, which are relevant to freeze-thaw studies.

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8. **Isothermal Calorimetry:** Monitors heat release during hydration, essential for understanding the hydration kinetics of cementitious materials.
 9. **Slabtester Environmental Chamber (Freeze/Thaw):** This chamber simulates freeze-thaw cycles to evaluate concrete durability under cyclic freezing conditions.
 10. **Transmission Electron Microscopy (TEM):** Allows for high-resolution imaging at the nanoscale, revealing fine microstructural details.
 11. **Fourier-transform infrared spectroscopy (FTIR):** Analyzes molecular composition and detects functional groups within cementitious materials.
 12. **Thermogravimetric Analysis (TGA):** Measures weight changes with temperature, assessing thermal stability and composition.
 13. **X-ray Fluorescence (XRF):** Determines elemental composition, useful for identifying key components and potential contaminants.
 14. **Pore Solution Extractor:** Extracts pore solution for chemical analysis, providing insights into ionic composition and chloride concentration.

COMPUTER SKILLS

CemGEM, MatLab, Mathematica, Auto CAD 2D, ETABS, PLAXIS 2D,3D, PLAN SWIFT, SPSS, AcaStat, ImageJ

MEDIA COVERAGE

My MSc thesis, titled 'Utilizing COVID-19 Single-use Face Masks as a Low Carbon Strategy to Enhance the Rutting Resistance of Asphalt Pavement,' received significant media attention. Various TV channels, radio stations, newspapers, and social media platforms interviewed me.

1. East Carolina University News on 6/24/2021. [News Link](#). [Facebook News link](#):
2. News is published on NCDOT's official website, Facebook, and LinkedIn. [Website news Link](#)
3. Attended in an interview in WNCT-9 TV Channel on the topic [“ECU researchers test using recycled face masks as way to improve roads”](#) 6/29/2021.
4. An article on my face mask research has been published in Construction & Demolition Recycling, an online portal.
5. A report has been published on the ABC news Channel website. [Link](#)
6. News published on the WNCT website. [Link](#)
7. News aired on the WITN TV channel on 06/24/2021. [Link](#)
8. Ground Break Carolinas, an online news portal, has published an article. [Link](#)
9. News aired on public radio in Eastern North Carolina. [News Link](#)

PROFESSIONAL MEMBERSHIP

1. American Concrete Institute (ACI)
2. American Society of Civil Engineering (ASCE)

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3. Structural Engineers Association (SEA)
 4. Associated Schools of Construction (ASC)
 5. American Standard Test Method (ASTM) International
 6. Institute of Transportation Engineers (ITE)
 7. American Society of Highway Engineers (ASHE)
 8. American Road & Transportation Builders Association (ARTBA)
 9. Earthquake Engineering Research Institute
 10. Society of Asian Scientists and Engineers
 11. Civil and Environmental Engineering Graduate Student Council Virginia Tech
 12. Sigma Lambda Chi Honor Society
 13. The Institution of Engineers, Bangladesh (IEB)
 14. The College of Engineering and Technology's Student Leadership Council, East Carolina University, Greenville, North Carolina

TRAINING & WORKSHOPS

1. Attended a training on "Teaching Methods & Techniques" organized by Bangladesh University from 11th to 15th January 2020.
2. Attended a workshop on "Unlocking Materials' Secrets: Neutron Scattering for Multi-Scale Characterization Workshop" organized by Oak Ridge National Laboratory, TN.
3. Conducted a workshop on "Thumbs Rules for Structural Design in Architecture" organized by the Design Forum of BRAC University Architecture Department on 30th July 2021.