Dr. HIMANSHU SINGH, PhD

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EDUCATION

1. **University of South Florida** — Tampa, FL
   PhD *in Pure and Applied Mathematics* — *August 2018 - August 2023*
   - PhD Advisor: Dr. Joel A. Rosenfeld
   - Dissertation: **Applied Analysis for Learning Architectures**
   - Final GPA: *3.91/4*
2. **The University of Iowa** — Iowa City, IA
   MS in Mathematics — *August 2016 - May 2018*
3. **National Institute of Technology** — Rourkela, India
   Integrated MSc in Mathematics — *August 2010 - May 2015*

SERVICE EMPLOYMENT

1. **Visiting Assistant Professor*** — Tyler, TX
   Department of Mathematics, The University of Texas — *August 2023 - Current*
2. **Graduate Research Assistant** — Tampa, FL
   Department of Mathematics & Statistics, University of South Florida — *August 2020 - May 2023*
3. **Graduate Teaching Assistant** — Tampa, FL
   Department of Mathematics & Statistics, University of South Florida — *August 2018 - July 2020*
4. **Graduate Teaching Assistant** — Iowa City, IA
   Department of Mathematics & Statistics, The University of Iowa — *August 2016 - May 2018*
5. **Assistant Professor** — Greater Noida, India
   Department of Mathematics, IEC-GI — *Feb 2016 - July 2016*

RESEARCH GRANTS & FUNDING

1. **Funding for Artificial Intelligence and its Theory-Part 1** — $ 1829
   The Office of Dean, The University of Texas at Tyler — *Feb 2024 - Mar 2024*
2. **Funding for Artificial Intelligence and its Theory-Part 2** — $ 1000
   ORSSP, Robert R. Muntz Library, The University of Texas at Tyler — *Feb 2024 - Mar 2024*
3. **American Mathematical Society** — $ 1300
   AMS Graduate Student Travel Grant - Boston, MA — *Jan 2023*

PROFESSIONAL COMMUNITY RECOGNITION

1. American Mathematical Society's nomination in New Faces in Operator Theory and Function Theory-*January 2024*

ACCEPTED PAPERS AND UPCOMING PROJECTS

1. Machine Learning application of Generalized Gaussian Radial Basis Function & its Reproducing Kernel Theory
   Author(s): Himanshu Singh*
   Accepted (MDPI-Mathematics), Research Supported by Funding # 1 and # 2.

2. Data-driven discovery with Limited Data Acquisition for fluid flow across cylinder
   Author(s): Himanshu Singh*
   Submitted (Elsevier)

3. Provable convergence guarantee in Dynamical Systems
   Author: Himanshu Singh*
   ABSTRACTS of Papers Presented to the American Mathematical Society, Volume 45, Number 1, ISSN 2689-4831, **1192-47-27118**

4. A new perspective in Hilbert Space: Equivalent Norm Representation
   Author(s): Himanshu Singh*
   Manuscript in Preparation

5. Liouville Weighted Composition Operators overs the Fock Space
   Author(s): Himanshu Singh*, Benjamin P. Russo, Joel A. Rosenfeld
   Under Review (Journal of Mathematical Analysis and Applications)

6. A Data-Driven Inner-Product for NAR-type System Identification Problems
   Author(s): John Kyei, Himanshu Singh*, Benjamin P. Russo, Joel A. Rosenfeld
   Under Review (IEEE L-CSS)

7. On the theory of Mittag-Leffler Reproducing Kernel Hilbert Space
   Author: Himanshu Singh*
   ABSTRACTS of Papers Presented to the American Mathematical Society, Volume 43, Number 1, ISSN 2689-4831, **1174-46-8488**

8. Liouville weighted composition operators over Fock space
   Author: Himanshu Singh*
   ABSTRACTS of Papers Presented to the American Mathematical Society, Volume 44, Number 1, ISSN 2689-4831, **1183-47-19485**

9. A new kernel function for better AI methods
   Author(s): Himanshu Singh*
   ABSTRACTS of Papers Presented to the American Mathematical Society, Volume 44, Number 2, ISSN 2689-4831, **1185-68-23517**

10. Blaschke product Random Number Generator and its Monte Carlo simulation to Black-Scholes Stochastic Differential Equation
    Author(s): Himanshu Singh*, J. Darby Smith, William Severa, Joel A. Rosenfeld
    Manuscript in Preparation

RESEARCH INTERESTS

Artificial Intelligence, Optimization and Machine Learning, Reduced Order Modelling, Uncertainty Quantification, Data Science, Reproducing Kernel Hilbert Spaces, Quantum Theory, Koopman Operator Theory, Computational Complexity Theory

TECHNICAL SKILLS

Programming Julia, Python, C/C++, MATLAB, MATLAB-Data Science Toolbox

Design LaTeX, Manim

Mathematical Software Tools LaTeX, Mathematica, MATLAB

COMMUNITY LEADERSHIP EXPERIENCE

1. **American Physical Society-Data Science and AI/ML in Physics**, 5th April, 2024, *A data-driven discovery method with limited data*, (**presenter+speaker**).
2. **University of California, DAVIS, Dynamic Days US 2024**, 8th-10th Jan 2024, *Methods for Data-driven discovery with limited Data* (**Invited Poster Presentation**).
3. **AMS Special Session on New Faces in Operator Theory and Function Theory**, Joint Mathematics Meetings, 3rd-6th January 2024, *Provable convergence guarantee in Dynamical Systems* (**Invited Research Talk**).
4. 2023 Spring Eastern Sectional Meeting, **American Mathematical Society**, *A new kernel function for better AI methods*, April 1st-2nd, 2023 (**presenter+speaker**).
5. 39th Southeastern Analysis Meeting, **Clemson University**, *Applied analysis for better AI methods-II*, March 9th-11st, 2023 (**presenter+speaker**).
6. 2023 Southeastern Control Conference, **University of Florida**, *Applied analysis for better AI methods-I*, February 20th-21st, 2023 (**presenter+speaker**).
7. Sandia National Laboratories, February 9th 2023, *Blaschke Product Random number generator and its Monte Carlo simulation on Black-Scholes Differential Equation* (**Invited Research Talk**).
8. Joint Mathematics Meetings, 3rd-8th January 2023, *Liouville weighted composition operators over Fock space* (**presenter+speaker**).
9. The 7th Annual Meeting of SIAM Central States Section, **Oklahoma State University**, *Higher order Liouville weighted composition operators over the Fock space* (**presenter+speaker**).
10. Big Data 2022, **Harvard University**, August 26th, 2022.
11. NSF/CBMS Conference: Gaussian Random Fields, Fractals, SPDEs, and Extremes, **University of Alabama**, August 12th-13th, 2022.
12. GPOTS 2022 **Washington University in St. Louis**, *Liouville Weighted Composition Operator over the Fock space* (**presenter+speaker**).
13. Joint Mathematics Meetings, 6th-9th April 2022, *On the theory of Mittag-Leffler Reproducing Kernel Hilbert Space* (**Session Chair+presenter+speaker**).
14. **Mathematical Association of America-Allegheny Mountain Section** -1st-2nd April, 2022.
15. 38th Southeastern Analysis Meeting, March 5th - 6th, 2022, *Weighted composition operators over the Mittag-Leffler space* (**presenter+speaker**).
16. 2021 **AMS Fall Southeastern Virtual Sectional Meeting**, November 20th - 21st 2021.
17. IWOTA **Chapman University** 2021, *Liouville Weighted Composition Operator over the Fock space* (**presenter+speaker**).
18. IWOTA **Chapman University** 2021, *The trifecta of Hilbert spaces on Unit Disc* (**presenter+speaker**).
19. IWOTA **Lancaster University** 2021, *Liouville Weighted Composition Operator over the Fock space* (**presenter+speaker**).

20. IWOTA **Lancaster University** 2021, *The trifecta of Hilbert spaces on Unit Disc* (**presenter+speaker**).
21. 2TART, May 18. 2021, *The trifecta of Hilbert spaces on Unit Disc* (**presenter+speaker**).
22. SEAM-38, **University of Florida**, March 13th - 14th, 2021.
23. Workshop at the American Control Conference via ZOOM, June 30th, 2020.
24. Fall Southeastern Sectional Meeting at **University of Florida**, November 2nd - 3rd, 2019.
25. The complex analysis toolbox: new techniques and perspectives at the **University of Cambridge**, September 9th - 13th 2019.
26. Honoring the Life and Work of Jean Bourgain at **Institute for Advanced Study**, May 31st 2019 - June 1st 2019.

WORK EXPERIENCE

1. **University of South Florida** — Tampa, FL
   Research Assistant — *August 2020 - August 2023*
   - An Operator Theoretic Framework for NARMAX-type System Identification Problems
   - Higher Order Liouville weighted composition operator over the Fock Space
   - Liouville weighted composition operator over the Fock Space
   - The trifecta of Hilbert Spaces on Unit Disc
   - On the theory of Mittag-Leffler Reproducing Kernel Hilbert Space
   - Weighted composition operator on Mittag-Leffler Reproducing Kernel Hilbert Space
2. **University of South Florida** — Tampa, FL
   Teaching Assistant — *August 2019 - May 2020*
   - Course Supervisor: Dr. Dizona Jill
   - Course taught: MAC 2241, Life Sciences Calculus
3. **University of South Florida** — Tampa, FL
   Teaching Assistant — *January 2019 - May 2019*
   - Course Supervisor: Dr. Dizona Jill
   - Course taught: MAC 2241, Life Sciences Calculus
4. **The University of Iowa** — Iowa City, IA
   Teaching Assistant — *January 2018 - May 2018*
   - Course Supervisor: Dr. Peter Blanchard
   - Course Taught: MATH 1340, Math for Business
5. **National Institute of Technology** — Rourkela, India
   MSc Thesis: Study of Elliptic Partial Differential Equations — *August 2014 - May 2015*
   - ADVISOR: Dr. Debajyoti Choudhuri
   - Project encompasses the study of fundamental solutions for elliptic partial differential equations
   - *link of MSc thesis*
6. **Indian Institute of Technology** — Indore, India
   Summer Research Scholar — *May 2014 - July 2014*
   - ADVISOR: Dr. Sheikh Safique Ahmad
   - Worked on *Variational Characterization Principles in Fluid Solid Vibrations*

- Worked on the *matrix pencil* where the association eigenvalue is 0
- Concerns the numerical computation of internal electro-acoustic vibrations, i.e., harmonic vibrations of a coupled system consisting of an elastic solid enclosing an acoustic fluid

7. **Indian Institute of Management** — Lucknow, India
Winter Intern Scholar — *December 2013*
- ADVISOR: Dr. Gaurav Garg
- Worked on *Maximum Likelihood Method & Expectation Maximization Algorithm*
- Learned EM-Algorithm focuses on the maximum likelihood estimation of certain parameters in statistical models

8. **Indian Space Research Organization** — Ahmedabad, India
Summer Internship Scholar — *May 2013 - July 2013*
- Scientific Project Advisor: Scientist T. P. Srinivasan.
- Developed numerical analysis techniques on MATLAB at *High Resolution Data Processing Division* of *Space Applications Centre* under the project entitled *Implementation of Numerical Analysis Techniques on MATLAB*

PROFESSIONAL TEACHING EXPERIENCE

1. **University of South Florida** — Tampa, FL
Teaching Assistant — *August 2019 - May 2020*
- Course Supervisor: Dr. Dizona Jill
- Course taught: MAC 2241, Life Sciences Calculus

2. **University of South Florida** — Tampa, FL
Teaching Assistant — *January 2019 - May 2019*
- Course Supervisor: Dr. Dizona Jill
- Course taught: MAC 2241, Life Sciences Calculus

3. **University of South Florida** — Tampa, FL
Grader — *August 2018 - December 2018*
- Course Supervisor[1]: Dr. Igor Chitikov
- Course Graded[1]: MAC 2282 Engineering Calculus II, MAC 2283 Engineering Calculus III
- Course Supervisor[2]: Dr. Stephen D. Lappano
- Course Graded[2]: MAC 2233 Business Calculus

4. **University of South Florida** — Tampa, FL
Math Tutor — *August 2018 - December 2019*
- Course Supervisor: Dr. Ana Tores

5. **The University of Iowa** — Iowa City, IA
Teaching Assistant — *January 2018 - May 2018*
- Course Supervisor: Dr. Peter Blanchard
- Course Taught: MATH 1340, Math for Business

6. **The University of Iowa** — Iowa City, IA
Math Tutor — *August 2017 - December 2017*
- Course Tutored: MATH 1850, Calculus 1

7. **The University of Iowa** — Iowa City, IA
Grader — *August 2017 - December 2017*

- Course Supervisor: Dr. Muthu Krishnamurthy
- Course Graded: MATH 2850, Calculus III

8. **The University of Iowa** Iowa City, IA
Grader *August 2016 - May 2017*
- Course Supervisor: Dr. Muthu Krishnamurthy
- Course Graded: MATH 2550 Engineering Mathematics: Matrix Algebra

9. **IEC, GI** Greater Noida, India
Assistant Professor *February 2016 - July 2016*
- Course Taught: NAS-401: Complex Analysis, Statistical Techniques and Numerical Techniques.

REFERENCES

Reference 1 Dr. Joel A. Rosenfeld, Assistant Professor, Department of Mathematics and Statistics, University of South Florida, rosenfeldj@usf.edu.

Reference 2 Dr. Benjamin P. Russo, Postdoctoral Research Associate, Oak Ridge National Laboratory - CSMD, russobp@ornl.gov.

Reference 3 Dr. J. Darby Smith, Senior Member Of Technical Staff, Sandia National Laboratories-CCR, jsmit16@sandia.gov.

Reference 4 Dr. Sherwin Kouchekian, Associate Professor, Department of Mathematics and Statistics, University of South Florida, skouchekian@usf.edu.

Reference 5 Dr. Madeline Dawsey, Assistant Professor, Department of Mathematics, The University of Texas at Tyler, mdawsey@uttyler.edu.

Reference 6 Dr. David Milan, Professor, Department of Mathematics, The University of Texas at Tyler, dmilan@uttyler.edu.