Natanael S. Alpay

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EDUCATION

University of California, Irvine

- Mathematics Ph.D. Candidate — *2022 - 2026/27*

- Master of Science in Applied Mathematics — *2022 - 2024*

Chapman University

-Bachelor of Science in Mathematics *2017-2022*	*-Bachelor of Art in French* *2018-2022*
-Bachelor of Science in Physics *2019-2022*	*-Bachelor of Science in Computer Science* *2018-2022*

CERTIFICATE

Northeast Big Data Innovation Hub and NSDC — **Jan 2025**
Data Cleaning, Python, Time Series & Geospatial Analysis, Data Visualization.

WORK EXPERIENCE

Mentor — **Jan 2025 - June 2025**
Data Analysis mentor at DATA@UCI for undergraduate research project at UCI.

Research Assistant — **Sept 2022 - Current**
Research assistent focusing on pure and applied mathematics at UCI.

Teaching Assistant — **Sept 2022 - Current**
Teaching assistant for Calculus, real and complex analysis and more at UCI.

Research Assistant — **June 2022 - Aug 2022**
Research assistant in implementing machine learning alogirthm at Chapman.

Student Assistant — **2018 - Dec 2021**
Student assistant and grader for calculus at Chapman University

Tutor — **Sept 2019 - May 2022**
Mathematics, Physics, French and computer Science tutor at Chapman University.

Supplementary Instructor (SI) — **Sept 2020 - May 2022**
SI for calculus 2 (math 111), Chapman University.

Student Undergraduate Research Assistant — **Sep 2021 - Aug 2021**
Math department, Chapman University.

RESEARCH PUBLICATIONS

Feb 1, 2025   Natanael Alpay, Paata Ivanisvili *Lower Bounds for Dyadic Square Functions of indicator functions of sets* (submitted)

Preprint 2025   Natanael Alpay, Kamal Diki, *On the Complex Representer Theorem and Relations between the Fock space and Superoscillations*

March, 2025	Natanael Alpay, Antonino De Martino, Kamal Diki *The Fueter Mittag-Leffler Bargmann transform*
Jan, 2025	Natanael Alpay, Tiju Cherian John, *Thermal States on Mittag-Leffler Fock Space of the Slitted Plane*
Nov, 2023	Natanael Alpay, Kamal Diki *On the Mittag Leffler Bargmann (MLB) transform*
Feb, 2022.	Alpay, N., Cerejeiras, P., and Kähler, U., *Generalized Fock space and fractional derivatives with Applications to Uniqueness of Sampling and Interpolation Sets.* (submitted)
March, 2023.	Natanael Alpay, *A new characterization of the Hardy space and of other spaces of analytic functions*
March, 2021.	Alpay N., Jipsen P., Sugimoto M. (2021) *Unary-Determined Distributive ℓ-magmas and Bunched Implication Algebras.*
Jan, 2020.	Alpay, N. and Jipsen, P. *Commutative doubly-idempotent semirings determined by chains and by preorder forests.*

AWARDS/ HONORS

NSF Travel Support Grant   June 2025

NSF travel grant to the 36th International Workshop on Operator Theory and its Applications, to be held at the University of Twente from July 14 – 18, 2025.

Ronald M. Huntington Outstanding Scholarship Award   May 2022

The award is presented to the graduating senior judged to have exhibited the most distinguished record of scholarly accomplishments as a student at Chapman University.

Outstanding Mathematics Student Honors   May 2022

Honors award for outstanding mathematics student in the graduating class of Schmid College of Science and Technology 2022.

Outstanding Physics Student Honors   May 2022

Honors award for outstanding physics student in the graduating class of Schmid College of Science and Technology 2022.

Undergraduate Scholarly Creative Grant   April 2020

Recived the Undergraduate Scholarly/Creative Grant for research project titled: *The structure of distributive idempotent weakly conservative lattice-ordered magmas.*

SURF Award   April 8, 2020

Got selected as one of the fellowship recipients for Chapman University's Summer Undergraduate Research Fellowship. For project titled: *Differential Forms as Tools in Differential Geometry and Analysis on Manifolds.*

Undergraduate Scholarly Creative Grant   June 2019

Undergraduate Scholarly/Creative Grant for research project. For project titled: *Commutative doubly-idempotent semirings determined by chains and by preorder forests.*

Data-Fest First Place   **May 2019**

First Place, and best Insight awards at DataFest 2019 (team *git rekt*), Chapman University.

**RESEARCH
TALKS**

July 18, 2025 **International Workshop on Operator Theory and its Applications 2026** *Thermal States on Mittag Leffler Fock Space of the Slitted Plane*

July 18, 2025 **International Workshop on Operator Theory and its Applications 2026** *The Mittag-Leffler Bargmann transform, and its extension to the quaternionic setting*

April 26, 2025 **Southern california Applied mathematics symposium** *Special Functions as Solutions to The Least Square Problems*

March 28, 2025 **22nd Annual Workshop on Applications and Generalizations of Complex Analysis** *Lower Bounds for Dyadic Square Functions of indicator functions of sets*

March 20, 2025 **Mathematics of Data, Dynamics, and Life Sciences** *On the Complex Representer Theorem and Applications to Minimization Problems*

Nov 19, 2024 **Advances in Operator Theory with Applications to Mathematical Physics 2025** *On the complex representer theorem and applications*

Jan 11, 2024 **Workshop on Schur Analysis and Applications to Hypercomplex Analysis, Neural Networks and Linear Systems** *Thermal States on Mittag-Leffler Fock Space of the Slitted Plane*

Jan 4, 2024 **JMM 2024** *Thermal States on Mittag Leffler Fock Space of the Slitted Plane*

Oct 31, 2023 **Heat Flow, two-point inequalities, and beyond** *On Complex Hypercontractivity after S. Janson.*

Nov 15, 2022 **Advances in Operator Theory with Applications to Mathematical Physic 2022** Advances in Operator Theory with Applications to Mathematical Physics, titled: *On the Mittag Leffler Bargmann (MLB) transform .*

May 21, 2022 **WORKSHOP on Operator Theory with an Eye on Linear Systems and Hypercomplex Analysis** *On the Mittag Leffler Bargmann (MLB) transform*

Nov 20, 2021. **SCCUR 2021** Southern California Conference for Undergraduate Research.
Titled *Generalized Fock space using fractional derivatives with Applications to Uniqueness of Sampling and Interpolation Sets*

Aug 11, 2021. **IWOTA 2021** in special session: Hilbert Spaces of Analytic Functions and Applications.
Titled: *Generalized Fock space and fractional derivative.*

Oct 29, 2020. **International Conference on Relational and Algebraic Methods in Computer Science 2020** - 18th International Conference on Relational and Algebraic Methods in Computer Science , October 29 2020, at École polytechnique in Palaiseau, France.
Titled: *Commutative doubly-idempotent semirings determined by chains and by preorder forests.*

May 9, 2020 **Chapman Capstone presentation**. Titled *The Structure of Distributive Idempotent Weakly Conservative Lattice-ordered Magmas.*

May 9, 2020 **Chapman Capstone presentation** =. Tilted *Minimal Surfaces.*

Jan 17, 2020. **JMM 2020 national meeting** in Denver, CO, at the AMS Contributed Paper Session on Algebra and Algebraic Geometry, I .
Titled: *Some structural results about commutative doubly-idempotent semirings*

Nov 10, 2019. **AMS 2019 Sectional meeting** at UC Riverside in the Undergraduate research special sessio.
Titled: *Some structural results about commutative doubly-idempotent semirings*

OTHER PROJECTS	**Student-Faculty Research Activity for Course Credit** 2021

Student-Faculty Research Activity for Course Credit   **2021**

Student-Faculty Research and Creative Activity for Course Credit with Dr. Vajiac. Titled: *The Mathematical Basis of General Relativity.*

Student-Faculty Research Activity for Course Credit   **2021**

Student-Faculty Research and Creative Activity for Course Credit with Dr. Dressel. Titled: *Quantum Trajectories for Qutrit Processors.*

Mathematical objects in virtual reality   **2020-2022**

Have been working with Dr. Jipsen on representing abstract mathematical objects such as lattices in virtual reality.

Student-Faculty Research Activity for Course Credit   **2020**

Student-Faculty Research and Creative Activity for Course Credit with Dr. Sebbar. Titled: *Road Map to Zeta ζ and Theta θ.*

Brain Institute   **summer 2018**

− Was part of the IRB team for sensory deprivation Float pod experiment about, and its connection to the placebo effect.
− Gathered statistics about the safety and health benefits of bikes and E-bikes, for the E-Bike project testing if it is a viable alternative for commuters.

ATTENDED WORKSHOPS

- *Mathematical foundations of data science* , Université de Montreál, May 20 - 24, 2025
- *22nd workshop on Applications and Generalizations of Complex Analysis* , Department of Mathematics of the University of Aveiro, March 28-29, 2025
- *Heat Flow, two-point inequalities, and beyond* , Univeristy of California Irvine Oct 30 - Nov 3 2023
- SYCO 4: Fourth Symposium on Compositional Structures, Chapman University May 2019

ADDITIONAL ACTIVITIES

- Helped in organizing technical details in a Math conference such as Abstract book, contacting people, and Name tags.
- Was the math club president and previous math club vice president at Chapman University.
- Was an active Physics and Philosophy club member

POSTER

Aug 4, 2021. Schmid Summer Research Showcase at Chapman University 2021. Titled *Machine Learning and Neural Networks, The theory behind implementations.*

May 6, 2021. Student symposium at Chapman University. Titled: *Quantum Trajectories for qutrit processes.*

May 6, 2021. Student symposium at Chapman University. Titled: *Mathematical basis for general relativity.*

Nov 27, 2019. Poster presentation Student Scholar Symposium, Chapman University. Titled: *Some structural results about commutative doubly-idempotent semirings*

ADDITIONAL SKILLS

- Speaks French, English and Hebrew fluently. Russian and a bit Arabic.
- Linux user
- 3D modeling, 3D Printing, CNC, and Soldering
- Avid Lego builder.