

Michael Heinz

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EDUCATION

The Ohio State University

August 2016 - May 2020

B.S. in Mathematics and Physics with Honors (double major)

Overall GPA (4.00 scale): 4.00; Major GPA: 4.00

Hilliard Davidson High School

August 2012 - June 2016

Valedictorian of Class of 2016

RESEARCH EXPERIENCE

Resummation of Divergent Series

February 2018 - May 2019, August 2019 - Present

Undergraduate Research Asst. advised by Prof. Ovidiu Costin (Mathematical Physics) Columbus, OH

- Conducting university funded research on advanced methods for resummation of divergent series to convergent solutions that give maximum information about the behavior of the associated function when dealing with incomplete information
- Applicable to various fields including obtaining higher precision in critical expansions at low and high temperatures in statistical mechanics
- Applying a new method of resummation developed by Prof. Costin to Painlevé Equation PII
- Conference and Forum Presentations:
 - Young Mathematicians Conference August 2019
The Ohio State University
 - Denman Undergraduate Research Forum February 2019
The Ohio State University
 - Autumn Undergraduate Research Festival November 2018
The Ohio State University
- Publication:
 - M. Heinz and O. Costin, *The Binary Rational Expansion for Painlevé Equation PII*, in preparation

Hydrodynamic Fluctuations in High Energy Nuclear Collisions

May 2019 - July 2019

Wayne State JETSCAPE REU advised by Prof. Chun Shen (High Energy Nuclear Theory) Detroit, MI

- Conducted theoretical research funded by JETSCAPE on the smoothed particle hydrodynamics (SPH) method to solving PDE's for hydrodynamic fluctuations in high energy nuclear collisions
- Wrote an open source code package in C++ with C++ 11 standard, as well as a summarizing report
- https://bitbucket.org/wayne_state_nuclear_theory/sph_solver/src/master/

Virtual Knot Invariants

June 2017 - December 2017

Knots and Graphs Research Program advised by Prof. Sergei Chmutov Columbus, OH

- Conducted university funded on-the-fringe research on multiple knot invariants for virtual knots
- Worked to develop a novel knot invariant that would expand on current knowledge and distinguish more virtual knots
- Helped develop a program to output different knot invariants for any inputted virtual knot
- <https://people.math.osu.edu/chmutov.1/wor-gr-su17/wor-gr.htm>

Exploration in Low Energy Nuclear Theory

June 2016 - December 2016

Undergraduate Research Assistant to Prof. Robert Perry (Low Energy Nuclear Theory) Columbus, OH

- Independently studied various problems in Quantum Mechanics and discussed findings with Dr. Perry
- Attended research meetings of the Low Energy Nuclear Theory group

WORK EXPERIENCE

The Ohio State University Dept. of Mathematics Aug. 2017 - Dec. 2017, Aug. 2018 - Present
Teaching Assistant *Columbus, OH*

- Lead two bi-weekly Precalculus recitations of 30+ students each semester
- Facilitate discussion, solve problems and address students' questions about material
- Assist students outside of recitation through tutoring and office hours
- Administer quizzes and exams throughout the semester

Colburn Hill Group November 2018 - May 2019
Contractor *Columbus, OH*

- Created AI using UiPath to scrape relevant information from health care sites and post them to databases

Math and Stats Learning Center at The Ohio State University January 2018 - May 2018
Mathematics Tutor *Columbus, OH*

- Explained Calculus and other mathematics concepts in simplified language to increase understanding
- Helped students of various ages and levels connect concepts to continuously expand knowledge
- Identified individual learning levels of different students and broke down complex problems accordingly

ACADEMIC AWARDS

- | | |
|---|---|
| · Goldstein Math Scholarship
<i>Department of Mathematics</i> | Autumn 2019
<i>The Ohio State University</i> |
| · Smith Junior Award Winner
<i>Departement of Physics</i> | April 2019
<i>The Ohio State University</i> |
| · Merit Scholarship from Gordan Memorial Fund
<i>Department of Mathematics</i> | Spring 2019
<i>The Ohio State University</i> |
| · Merit Scholarship from Gordan Memorial Fund
<i>Department of Mathematics</i> | Autumn 2018
<i>The Ohio State University</i> |
| · Smith Sophomore Award Winner
<i>Departement of Physics</i> | April 2018
<i>The Ohio State University</i> |
| · Honorable Mention in the Gordon Mathematics Competition
<i>Rasor-Bareis-Gordon Mathematics Competition</i> | March 2018
<i>The Ohio State University</i> |
| · Merit Scholarship from George Majda Scholarship Fund
<i>Department of Mathematics</i> | Spring 2018
<i>The Ohio State University</i> |
| · Helen Cowan Book Award Winner
<i>Departement of Physics</i> | April 2017
<i>The Ohio State University</i> |
| · Merit Scholarship from George Majda Scholarship Fund
<i>Department of Mathematics</i> | Autumn 2017
<i>The Ohio State University</i> |
| · Second Place in the Gordon Mathematics Competition
<i>Rasor-Bareis-Gordon Mathematics Competition</i>
– awarded Goldstein Mathematics Scholarship | March 2017
<i>The Ohio State University</i> |
| · Merit Scholarship from Morris Endowment Fund
<i>Department of Mathematics</i> | Autumn 2016
<i>The Ohio State University</i> |
| · Maximus Scholarship | Autumn 2016 - Spring 2020
<i>The Ohio State University</i> |

TALKS AND PRESENTATIONS

- “Padé Approximations and their Applications” January 2019
Given for the Low Energy Nuclear Theory group at The Ohio State University
- “Helley’s Theorem on Convex Sets” November 2016
Given in Math 5529H, Honors Combinatorics

SKILLS AND RELEVANT COURSEWORK

Skills: Familiarity with C++, Python, UiPath, Maple, Mathematica, Microsoft Excel

Relevant Coursework:

- Introduction to C++ (CSE 1222)
- Computational Physics (Phys 6810)
- Physics Data Analysis Lab (Phys 3700)
- Intro to Mathematical Statistics II (Stats 4202)
- Honors Probability (Math 5530H)
- Honors Linear Alg. and Diff. Eqns. (Math 5520H)

ACTIVITIES

- Member of the Radical Pi Math Club at OSU August 2016 - Present
- Bassist in The Buckeye Philharmonic August 2016 - May 2019
- Putnam Competition participant (achieved best score of 20, rank 693.5 out of 4,638) 2016, 2017