

# Michael Heinz - Curriculum Vitae

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<https://mheinz757.github.io/>

## 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:
  - O. Costin and M. Heinz, *Rational Approximations for Painlevé PII Solutions* In preperation

### 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 solve partial differential equations 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/](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 cutting-edge 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 Asst. to Prof. Robert Perry (Low-Energy Nuclear Theory) Columbus, OH*

- Independently studied various problems in quantum mechanics and discussed findings with Prof. Perry
- Attended research meetings of the Low-Energy Nuclear Theory group

## WORK EXPERIENCE

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**The Ohio State University Dept. of Mathematics**      Aug. 2017 - Dec. 2017, Aug. 2018 - Present  
*Student Instructional 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 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

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

## TALKS AND PRESENTATIONS

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- “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 ACTIVITIES

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### Skills:

- Proficient: C++, Maple, Mathematica, L<sup>A</sup>T<sub>E</sub>X
- Familiar: Python, UiPath

### Activities:

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