

# ALLEN LIN

## CURRICULUM VITAE

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## ACADEMIC INTERESTS

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Number theory, combinatorics, analysis, Boolean functions, complexity theory, algorithms

## EDUCATION

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| 2026 | <b>Massachusetts Institute of Technology</b><br>S.B., Mathematics & Computer Science and Engineering | Cambridge, MA 02139<br><b>GPA: 5.0/5.0</b>       |
| 2022 | <b>Gatton Academy of Mathematics and Science</b><br>Diploma, Community Scholar with Distinction      | Bowling Green, KY 42101<br><b>GPA: 4.00/4.00</b> |
| 2022 | <b>Larry A. Ryle High School</b><br>Diploma, Summa Cum Laude   | Union, KY 41091<br><b>GPA: 4.00/4.00</b>         |

## PUBLICATIONS AND PREPRINTS

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5. Saba Lepsveridze and **Allen Lin**, “Optimal Thresholds for Monotone Non-Boolean Functions.” *Submitted*. <https://arxiv.org/abs/2509.07246>.
4. Dominic Lanphier and **Allen Lin**, “Polygamma functions, the Lerch transcendent, and peaks and descents of permutations.” *Under revision*.
3. **Allen Lin**, “Perimeter Reduction of Circular Symmetrization in  $\mathbb{R}^2$ .” *Submitted*.
2. Roni Edwin and **Allen Lin**, “The Gauss Circle Problem and Fourier Quasicrystals.” *Int. Math. Res. Not. IMRN* **2025**, no. 19 (2025): 1–32. <https://doi.org/10.1093/imrn/rnaf293>.
1. Dominic Lanphier and **Allen Lin**, “Values of certain Dirichlet series and higher derivative formulas of trigonometric functions.” *Int. J. Number Theory* **20**, no. 4 (2024): 995–1016. <https://doi.org/10.1142/S1793042124500519>.

## CONTRIBUTED TALKS

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12. “Modular and Automorphic Forms.” 31 Jan 2025. Directed Reading Program, Department of Mathematics, at the Massachusetts Institute of Technology, Cambridge, MA.
11. “The Gauss Circle Problem and Fourier Quasicrystals.” 2 Aug 2024. Summer Program in Undergraduate Research, Department of Mathematics, at the Massachusetts Institute of Technology, Cambridge, MA.
10. “Analysis of Boolean Functions.” 3 Feb 2023. Directed Reading Program, Department of Mathematics, at the Massachusetts Institute of Technology, Cambridge, MA.
9. “Values of Dirichlet Series.” 1 Apr 2022. Kentucky Section of the Mathematical Association of America Annual Meeting 2022.
8. “Properties of Pólya’s Circular Symmetrization.” Kentucky Section of the Mathematical Association of America Annual Meeting 2022.

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<sup>1</sup>Updated December 26, 2025

7. “Values of Dirichlet Series.” 25 Feb 2022. 41st Annual Mathematics Symposium at Western Kentucky University, Bowling Green, KY.
6. “Properties of Pólya’s Circular Symmetrization.” 25 Feb 2022. 41st Annual Mathematics Symposium at Western Kentucky University, Bowling Green, KY.
5. “Make Your Own Fractal.” 25 Feb 2022. 41st Annual Mathematics Symposium at Western Kentucky University, Bowling Green, KY.
4. “Properties of Pólya’s Circular Symmetrization.” 6 Aug 2021. 38th Annual Session of the Research Science Institute at the Massachusetts Institute of Technology.
3. “Values of Dirichlet Series.” 9 Apr 2021. Student Research Conference at Western Kentucky University, Bowling Green, KY.
2. “Values of Dirichlet Series.” 26 Mar 2021. Kentucky Section of the Mathematical Association of America Annual Meeting 2022.
1. “Values of Dirichlet Series.” 20 Feb 2021. 40th Annual Mathematics Symposium at Western Kentucky University, Bowling Green, KY.

## RESEARCH EXPERIENCE

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|-------------------|---|
| Jun 2025–Aug 2025 | <b>Undergraduate Researcher</b><br>Department of Mathematics, Massachusetts Institute of Technology<br><i>Proved tight <math>O(1/\log n)</math> bound on the sharp threshold result of monotone symmetric non-Boolean functions [5] with Saba Lepsveridze, improving the previous bound of <math>O(\log \log n / \log n)</math> of Prof. Elchanan Mossel and Prof. Gil Kalai.</i> |
| Jun 2024–Dec 2024 | <b>Summer Program in Undergraduate Research (SPUR)</b><br>Department of Mathematics, Massachusetts Institute of Technology<br><i>Proved upper, lower, and average bounds on the number of points of a Fourier quasicrystal in a ball of radius <math>r</math> [2] with Roni Edwin and Dr. Lior Alon.</i>  |
| Sep 2020–May 2022 | <b>Undergraduate Researcher</b><br>Department of Mathematics, Western Kentucky University<br><i>Proved closed forms on certain types of Dirichlet series and infinite series, as well as transcendentality of these values [1] and closed forms of certain combinatorial numbers [4] with Prof. Dominic Lanphier.</i>   |
| Jun 2021–Aug 2021 | <b>Research Science Institute Researcher</b><br>Department of Mathematics, Massachusetts Institute of Technology<br><i>Reproved the perimeter reduction property of Pólya’s circular symmetrization algorithm using methods from analysis and geometry [3] with Dr. Sarah Tammen.</i>   |

## TEACHING EXPERIENCE

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|-------------------|---|
| Feb 2026–         | <b>Teaching Assistant, 18.781</b><br>Department of Mathematics, Massachusetts Institute of Technology                           |
| Jan 2026–         | <b>Grader, 18.031</b><br>Department of Mathematics, Massachusetts Institute of Technology                                       |
| Feb 2025–Dec 2025 | <b>Lab Assistant, 6.191</b><br>Department of Electrical Engineering and Computer Science, Massachusetts Institute of Technology |
| Jan 2025–Jan 2025 | <b>Grader, 18.031</b><br>Department of Mathematics, Massachusetts Institute of Technology                                       |
| Feb 2024–Dec 2024 | <b>Grader, 18.901</b><br>Department of Mathematics, Massachusetts Institute of Technology                                       |
| Jul 2023–Aug 2023 | <b>Last-Week Teaching Assistant</b><br>Research Science Institute, Massachusetts Institute of Technology                        |

## ORGANIZATIONS

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| Sep 2022–May 2024 | <b>Educational Studies Program</b><br>Massachusetts Institute of Technology                        |
| Sep 2022–May 2023 | <b>Harvard-MIT Math Tournament</b><br>Harvard University and Massachusetts Institute of Technology |
| Sep 2022–May 2023 | <b>Undergraduate Math Association</b><br>Massachusetts Institute of Technology                     |
| Nov 2020–May 2022 | <b>Society for Industrial and Applied Mathematics</b><br>Western Kentucky University               |

## OTHER POSITIONS

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|-------------------|---|
| Aug 2023–         | <b>Associate Advisor</b><br>Office of the First Year, Massachusetts Institute of Technology   |
| Feb 2025–Aug 2025 | <b>Discover Math First-Year Pre-Orientation Head Program Counselor</b><br>Office of the First Year, Massachusetts Institute of Technology |
| Jun 2023–Aug 2025 | <b>Discover Math First-Year Pre-Orientation Program Counselor</b><br>Office of the First Year, Massachusetts Institute of Technology      |
| Nov 2023–Nov 2023 | <b>Integration Bee Committee</b><br>Harvard-MIT Math Tournament   |
| May 2023–Aug 2023 | <b>High School Studies Program, Summer Director</b><br>Educational Studies Program, Massachusetts Institute of Technology                 |
| Feb 2023–Feb 2023 | <b>Integration Bee Committee</b><br>Harvard-MIT Math Tournament   |
| Feb 2023–May 2023 | <b>Diversity, Inclusion, and Equity Committee Chair</b><br>Undergraduate Math Association, Massachusetts Institute of Technology          |
| Sep 2022–May 2023 | <b>Problem-Writing Staff</b><br>Harvard-MIT Math Tournament   |
| Sep 2022–May 2023 | <b>Diversity, Inclusion, and Equity Committee Member</b><br>Undergraduate Math Association, Massachusetts Institute of Technology         |
| Sep 2020–May 2022 | <b>Peer Tutor</b><br>Gatton Academy of Mathematics and Science, Western Kentucky University   |
| Aug 2020–May 2022 | <b>Audience Assistant</b><br>Hardin Planetarium, Western Kentucky University  |

## AWARDS

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|------|---|
| 2022 | <b>Community Scholar, Honors with Distinction</b> , Gatton Academy of Mathematics and Science   |
| 2022 | <b>Summa Cum Laude</b> , Ryle High School   |
| 2022 | <b>President's List</b> , Western Kentucky University   |
| 2022 | <b>Gates Scholar</b> , Bill & Melinda Gates Foundation  |
| 2022 | <b>National Merit Award Recipient</b> , National Merit Scholarship Corporation  |
| 2022 | <b>3rd Place at the Society for Industrial and Applied Mathematics Session of the 41st Annual Mathematics Symposium</b> , Western Kentucky University |
| 2022 | <b>Jack Kent Cooke College Scholarship Semifinalist</b> , Jack Kent Cooke Foundation  |
| 2021 | <b>President's List</b> , Western Kentucky University   |
| 2021 | <b>Program in Mathematics for Young Scientists Scholar</b> , Program in Mathematics for Young Scientists  |
| 2021 | <b>President's List</b> , Western Kentucky University   |
| 2021 | <b>Research Science Institute Scholar</b> , Research Science Institute  |
| 2021 | <b>Mathematics Regional Champion</b> , Kentucky Association for Academic Competition  |
| 2020 | <b>President's List</b> , Western Kentucky University   |

## LICENSES AND CERTIFICATIONS

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2021   **Wolfram Mathematica Student Certification Level I**, Wolfram