

# Younghan Bae – CV

---

|                      |  |  |
|----------------------|--|--|
| PERSONAL INFORMATION | <b>Citizenship:</b> Republic of Korea<br><b>ORCID:</b> 0000-0002-3984-1742   |  |
| CONTACT INFORMATION  | Michigan University<br>2074 East Hall, 530 Church Street, Ann Arbor, Michigan  | E-mail: <a href="mailto:younghan@umich.edu">younghan@umich.edu</a><br>Webpage: <a href="https://younghbae.github.io">https://younghbae.github.io</a> |
| EMPLOYMENT           | <b>University of Michigan</b><br>Donald J. Lewis Research Assistant Professor<br><b>Utrecht University</b><br>Postdoctoral fellow supported by SNSF Postdoc.Mobility grant   | September 2024 – May 2027<br>September 2023 – August 2024  |
| EDUCATION            | <b>Ph.D. in Mathematics</b> , ETH Zürich<br>Advisor: Prof. Dr. Rahul Pandharipande<br><b>M.S. in Mathematics</b> , Columbia University<br><b>B.S. in Mathematics</b> , Seoul National University<br>(Military service, 01. 2013 – 10. 2014)  | September 2018 – August 2023<br>September 2017 – June 2018<br>March 2011 – March 2017<br>SUMMA CUM LAUDE   |
| INTERESTS            | algebraic geometry, moduli spaces, enumerative geometry, abelian fibrations, algebraic cycles, algebraic stacks  |  |
| PUBLICATION          | <ul style="list-style-type: none"> <li>• <i>Counting surfaces on Calabi-Yau 4-folds I: Foundations</i> (with Martijn Kool and Hyeonjun Park), to appear in <b>Geometry and Topology</b></li> <li>• <i>Sheaf counting theory for dimension three and four</i>, in Moduli Spaces, Virtual Invariants and Shifted Symplectic Structures, <b>KIAS Springer Ser. Math.</b>, 4 (2025)</li> <li>• <i>Pixton's formula and Abel-Jacobi theory on the Picard stack</i> (with David Holmes, Rahul Pandharipande, Johannes Schmitt, Rosa Schwarz), <b>Acta Mathematica</b> 230 (2023), 205–319</li> <li>• <i>Chow rings of stacks of prestable curves II</i> (with Johannes Schmitt), <b>Journal für die reine und angewandte Mathematik</b> 800 (2023), 55–106</li> <li>• <i>Intersection theory of the universal Picard stack</i>, <b>doctorial thesis</b>, ETH Zürich (2023).</li> <li>• <i>Chow rings of stacks of prestable curves I</i> (with Johannes Schmitt and an appendix joint with Jonathan Skowera), <b>Forum of Mathematics, Sigma</b>, 10, e28 (2022), 1–47</li> <li>• <i>Curves on K3 surfaces in divisibility two</i> (with Tim Buelles), <b>Forum of Mathematics, Sigma</b>, 9 e9 (2021), 1–37</li> <li>• <i>Tautological relations for stable maps to a target variety</i>, <b>Arkiv för Matematik</b>, 58 (1) (2020), 19–38</li> </ul> |  |
| PREPUBLICATION       | <ul style="list-style-type: none"> <li>• <i>The intrinsic cohomology ring of the universal compactified Jacobian over the moduli space of stable curves</i>, (with Davesh Maulik, Junliang Shen and Qizheng Yin) arXiv:2509.05577</li> <li>• <i>Fourier transforms and Abel-Jacobi theory</i> (with Sam Molcho and Aaron Pixton), arXiv:2506.06116</li> <li>• <i>On generalized Beauville decompositions</i> (with Davesh Maulik, Junliang Shen and Qizheng Yin), arXiv:2402.08861</li> <li>• <i>Counting surfaces on Calabi-Yau 4-folds II: DT–PT<sub>0</sub> correspondence</i> (with Martijn Kool and Hyeonjun Park), arXiv:2402.06526</li> </ul>   |  |

|                        |  |                   |
|------------------------|--|-------------------|
| AWARDS AND FELLOWSHIPS | June E Huh Visiting Fellow, Korea Institute of Advanced Studies  | 11.2024 – 10.2027 |
|                        | Junior Trimester Program, Hausdorff Institute of Mathematics   | 09.2023 – 12.2023 |
|                        | Swiss National Science Foundation, Postdoc. Mobility fellowship  | 09.2023 – 08.2025 |
|                        | Korea Foundation for Advanced Studies, Doctoral Study Abroad Scholarship   | 09.2017 – 09.2022 |
|                        | Kwanjeong Educational Foundation, Kwanjeong scholarship  | 03.2015 – 03.2017 |
| CONFERENCE ORGANIZED   | <i>Moduli spaces of algebraic surfaces in Ann Arbor</i> , 20–22, May, 2025, University of Michigan, Michigan, USA  |                   |
|                        | <i>Geometry meets Physics, Calabi-Yau fourfolds and beyond</i> , 27–30. January, 2025, Woudschoten Conference Center, Zeist, Netherlands   |                   |
| CONFERENCE TALKS       | <i>Fourier transforms, perverse filtration and Abel-Jacobi theory</i> , Counting Invariants and Enumerative Geometry, Brin Mathematics Research Center, University of Maryland, 27.09.2025 |                   |
|                        | <i>Fourier transform and Abel-Jacobi theory</i> , Summer Research Institute in Algebraic Geometry (contribution talk), Colorado State University, 22.07.2025                               |                   |
|                        | <i>Intersection theory of algebraic stacks</i> , Workshop on moduli spaces, virtual invariants and shifted symplectic structures, KIAS, 19.06.2025   |                   |
|                        | <i>Fourier transforms and Abel-Jacobi theory</i> , Future of Mathematics Workshop, KIAS, 04.06.2025  |                   |
|                        | <i>Fourier transform and class of sections</i> , AMS Sectional Meeting–Enumerative invariants of moduli spaces in algebraic geometry, University of Kansas, 29.03.2025                     |                   |
|                        | <i>Modularity conjecture of counting surfaces on Calabi-Yau 4-folds</i> , Geometry meets Physics, Calabi-Yau fourfolds and beyond, Zeist, 01.2025  |                   |
|                        | <i>Surfaces on Calabi-Yau 4-folds</i> , Workshop on moduli spaces, virtual invariants and shifted symplectic structures, KIAS, Seoul, 06.2023  |                   |
|                        | <i>Surfaces on Calabi-Yau 4-folds, Part I, II</i> , Zhejiang Institute for Advanced Study in Mathematics (online), 18.10.2022 and 25.10.2022   |                   |
|                        | <i>Surfaces on Calabi-Yau 4-folds</i> , Geometry and Quantum Theory Conference, Utrecht, 26.08.2022  |                   |
|                        | <i>Counting surfaces on Calabi-Yau 4-folds</i> , Curves and K3 surfaces, Bonn, 12.05.2022  |                   |
|                        | <i>Relations from DR and DR(X)</i> , Double ramification cycles and integrable systems, American Institute of Mathematics, 09.10.2019  |                   |
|                        | <i>Tautological relations on the moduli space of stable maps</i> , Beijing-Zürich moduli workshop, BICMR Peking University, 11.09.2019   |                   |
| INVITED TALKS          | <i>Fourier transformations, Perverse filtrations, and Abel-Jacobi theory</i> , Algebraic geometry seminar, University of Pennsylvania, 18.11.2025 (upcoming)                               |                   |
|                        | <i>Geometry and topology of compactified Jacobians</i> , Algebraic Geometry and Combinatorics seminar, Washington University in St. Louis, 27.10.2025 (upcoming)                           |                   |
|                        | <i>Intersection theory of degenerate abelian fibration</i> , BK21 Geometry Seminar, Yonsei University, 10.06.2025  |                   |
|                        | <i>Fourier transforms and Abel-Jacobi theory</i> , Algebraic geometry seminar, La Sapienza, 07.05.2025   |                   |
|                        | <i>Intertwining Fourier transforms and Abel-Jacobi theory</i> , Algebraic geometry seminar, Tor Vergata, 06.05.2025  |                   |
|                        | <i>Fourier transform and Abel-Jacobi theory</i> , Algebraic geometry and moduli seminar, ETH Zürich, 02.05.2025  |                   |
|                        | <i>Fourier transforms, Abel-Jacobi theory and intersection theory of compactified Jacobians</i> , Algebraic geometry seminar, Michigan State University, 16.04.2025                        |                   |
|                        | <i>Counting surfaces in Calabi-Yau 4-folds</i> , Algebraic geometry seminar, University of Maryland, 09.04.2025  |                   |

- Fourier transform on compactified Jacobians*, Algebraic geometry and moduli seminar (Zoom), ETH Zürich, 27.11.2024
- Fourier transform and Abel-Jacobi section*, Algebraic Geometry Seminar, Columbia University, 15.11.2024
- Fourier transform and Abel-Jacobi section*, Harvard-MIT Algebraic Geometry Seminar, MIT, 05.11.2024
- Intersection theory on logarithmic Picard group*, Algebraic geometry seminar, UIUC, 15.10.2024
- Generalized Beauville decomposition for degenerate abelian fibrations*, Algebraic geometry seminar, University of Michigan, 25.09.2024
- Fourier transform and the class of Abel-Jacobi sections*, Algebraic geometry and moduli seminar, ETH Zürich, 28.06.2024
- Degenerate abelian fibrations and Fourier transformation*, HCMC colloquium, KIAS, Seoul, 13.06.2024
- Curves, line bundles and Fourier transform*, QSMS Seminar, Seoul National University, 05.06.2024
- Fourier transform and the class of sections*, Algebra, Geometry and Number theory seminar, Leiden University, 08.05.2024
- Lecture series on relative compactified Jacobian (3 lectures)*, Utrecht University, Spring 2024
- Moduli spaces of curves, line bundles and abelian varieties*, Utrecht Geometry Seminar, Utrecht University, 05.05.2024
- Generalized Beauville decomposition*, Algebraic / Arithmetic Geometry Seminar, Utrecht University, 29.02.2024
- Tautological classes on the relative Picard scheme*, Algebraic and Arithmetic Geometry Seminar, University of Pisa, 12.05.2023
- Surfaces on Calabi-Yau 4-folds*, Pohang University of Science and Technology, 19.01.2023
- Counting surfaces on Calabi-Yau 4-folds using the sheaf method*, Utrecht University, 06.05.2022
- Counting surfaces in Calabi-Yau fourfolds*, Intercontinental Moduli Zoominar, Zürich/Vancouver, 07.03.2022
- Descendent invariants for stable pairs on Calabi-Yau fourfolds*, Algebraic geometry and moduli seminar, ETH Zürich, 13.10.2021
- A recent development on the Abel-Jacobi theory*, Weekly Geometry Seminar (online), KIAS, Seoul, 15.07.2021
- Counting surfaces on Calabi-Yau 4-folds*, Algebraic geometry and moduli seminar, ETH Zürich, 19.06.2021
- The tautological ring of the stack of rational nodal curves*, Hodge seminar (online), Edinburgh Hodge Institute, 10.02.2021
- Chow group of the stack of prestable curves*, Algebraic geometry and moduli seminar (online), ETH Zürich, 23.09.2020
- Relations on the universal Picard stack and some applications*, Algebraic Geometry and Moduli Zoominar (online), ETH Zürich, 08.04.2020
- Tautological relations on the moduli space of stable maps*, Algebraic geometry and moduli seminar, ETH Zürich, 17.04.2019

## TEACHING EXPERIENCES

University of Michigan (2024–) and ETH Zürich (2019–2023):

|        |      |                                    |            |
|--------|------|------------------------------------|------------|
| Fall   | 2025 | Advanced linear algebra (Math 420) | Instructor |
| Spring | 2025 | Advanced linear algebra (Math 420) | Instructor |
| Fall   | 2024 | Calculus II (Math 116)             | Instructor |
| Spring | 2023 | Algebraic Topology II              | Organizer  |

|        |      |  |                       |
|--------|------|--|-----------------------|
| Spring | 2022 | Algebraic geometry                               | Organizer             |
| Fall   | 2021 | Commutative algebra                              | Exercise class        |
| Fall   | 2020 | Curves, Jacobians, and Modern Abel-Jacobi Theory | with R. Pandharipande |
| Spring | 2020 | Algebraic Geometry                               | Exercise class        |
| Fall   | 2019 | Funtionentheorie                                 | Organizer             |
| Spring | 2019 | Algebra I  | Exercise course       |

SKILLS AND  
LANGUAGE

Fluent in English and Native in Korean

REFERENCES

**Prof. Martijn Kool**

Utrecht University

E-mail: m.kool1@uu.nl

**Prof. Dr. Rahul Pandharipande**

ETH Zürich

E-mail: rahul@math.ethz.ch

**Prof. Aaron Pixton**

University of Michigan

E-mail: pixton@umich.edu