Hannes V. **Jakob**

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Education

Gymnasium Nepomucenum Rietberg — *Rietberg, Germany*
Abitur — *July 2008 - June 2016*

Albert-Ludwigs-Universität Freiburg — *Freiburg, Germany*
B.Sc. in Mathematics — *Oct. 2017 - Sept. 2020*
Bachelor's thesis in set theory titled "Cichoń's Maximum"

Albert-Ludwigs-Universität Freiburg — *Freiburg, Germany*
M.Sc. in Mathematics — *Oct. 2020 - Sept. 2022*
Master's thesis in set theory titled "Generalised Tree Properties"

Albert-Ludwigs-Universität Freiburg — *Freiburg, Germany*
Dr. rer. nat. in Mathematics — *Oct. 2022 - Jan. 2025*

- Graduated *summa cum laude*
- Thesis titled "Variants of Mitchell Forcing"
- Advisor: Prof. Heike Mildenberger

Positions

Albert-Ludwigs-Universität Freiburg — *Freiburg, Germany*
Wissenschaftlicher Mitarbeiter — *Oct. 2023 - August 2025*
Advisor: Prof. Heike Mildenberger

University of North Texas — *Denton, TX, USA*
Visiting Assistant Professor — *Starting September 2025*
Mentor: Prof. John Krueger

Teaching

Lecture: Combinatorics — *Winter 2023/2024*
Teaching Assistant — *Freiburg, Germany*

Seminar: Prikry-Forcing — *Summer 2024*
Teaching Assistant — *Freiburg, Germany*

Lecture: Mathematical Logic — *Summer 2024*
Teaching Assistant — *Freiburg, Germany*

Lecture: Set Theory — *Winter 2024/2025*
Teaching Assistant — *Freiburg, Germany*

Lecture: Topology — *Summer 2025*
Teaching Assistant — *Freiburg, Germany*

Publications and Preprints

Disjoint Stationary Sequences on an Interval of Cardinals — *2023*
J. — *Submitted*
We answer a question of Krueger by, from countably many Mahlo cardinals, constructing a model in which there is a disjoint stationary sequence on every $\aleph_n$, $n \geq 2$. In this model, for any $n \geq 1$ and any $\Theta > \aleph_n$ there are stationarily many $N \in [H(\Theta)]^{\aleph_n}$ which are internally unbounded but not internally club.

Slender Trees and the Approximation Property *2023*

J. *Submitted*

We prove several compatibility results regarding the ineffable slender property introduced by Christoph Weiss.

Distinguishing Internally Club and Approachable on an Infinite Interval *2024*

J., Maxwell Levine Bull. of the London Math. Soc.

We answer a question of Krueger by, from countably many Mahlo cardinals, constructing a model in which for any $n \geq 1$ and $\Theta > \aleph_n$ there are stationarily many $N \in [H(\Theta)]^{\aleph_n}$ which are internally club but not internally approachable.

Cascading Variants of Internal Approachability *2024*

J. *Submitted*

We show that it is consistent that there exist stationarily many models which are internally approachable of different variants at different levels. We also show that, in general, the approachability property at μ can hold together with the existence of stationarily many $N \in [H(\mu^+)]^{\mu}$ which are internally stationary but not internally club.

On Friedman's Property *2024*

J. *Submitted*

We introduce posets which gently add witnesses to the failure of variants of Friedman's property in order to separate many of these principles both at one cardinal and between different cardinals. Along the way we obtain that many known results which hold for κ-strategically closed forcings can fail for $< \kappa$-strategically closed ones.

Failure of Approachability at the Successor of the first Singular for any Cofinality *2025*

J., Maxwell Levine *Submitted*

We answer two long-standing open question regarding the successor of the first singular cardinal $\aleph_{\omega+1}$. Answering a question of Shelah we show that for any $n \in \omega$ there can consistently be stationarily many non-approachable points of cofinality $\aleph_{n+1}$. As a corollary, we answer a question of Cummings, Foreman and Magidor by showing that there can consistently be stationarily many good points which are non-approachable.

Invited Talks

On Friedman's Property *13.11.2024*

Set Theory Seminar at the Czech Academy of Sciences *Prague, Czech Republic*

Strong Distributivity and the Indestructibility of ISP *15.11.2024*

Workshop: Compactness and Cardinal Invariants II *Prague, Czech Republic*

Seminar Talks

Strong Distributivity and Games on Posets *25.04.2023*

Oberseminar: Mathematische Logik *Freiburg, Germany*

Forcings with the Approximation Property *12.12.2023*

Oberseminar: Mathematische Logik *Freiburg, Germany*

Friedman's and other Reflection Properties *06.04.2024*

Oberseminar: Mathematische Logik *Freiburg, Germany*

Contributed Talks

Cascading Variants of Internal Approachability *17.09.2024*

European Set Theory Conference *Münster, Germany*