

# CURRICULUM VITAE

## DR. RER. NAT. MARTIN BIES

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### PERSONAL DETAILS

Address: Mathematical institute  
University of Oxford  
Andrew Wiles Building  
Radcliffe Observatory Quarter  
Woodstock Road  
Oxford OX2 6GG

Email: bies@maths.ox.ac.uk

Nationality: German

Date of birth: 15/12/1987



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### SUMMARY

Education	<b>PhD in Physics</b> (Heidelberg university – defended on 01/02/2018)
Past research	<b>Physics:</b> <ul style="list-style-type: none"><li>• Phenomenological aspects of standard models in <b>string theory</b></li><li>• In particular <b>computation of massless spectra</b></li></ul> <b>Mathematics:</b> <ul style="list-style-type: none"><li>• Algorithms for cohomologies of <b>toric sheaves</b></li><li>• Constructive approaches to <b>Freyd categories</b></li></ul> <b>Software development</b> via <b>github</b> : <ul style="list-style-type: none"><li>• <b>Toric geometry</b> and <b>sheaf cohomologies</b> packages (language <b>gap</b>)</li><li>• Experience in <b>gap</b>, <b>python</b>, <b>C++</b>, <b>shell scripts</b>, <b>L<sup>A</sup>T<sub>E</sub>X</b></li></ul>
Teaching experience	Tutor for 8 lecture courses (Oct. 2012 – Oct. 2018) <b>Senior Tutor</b> in 2016 and 2018
Language skills	German – mother tongue <b>English – fluent</b> ( <b>Imperial College International Diploma</b> ) French – (CEFR level B1)
Scholarships	<b>FWA – Foundation Wiener-Anspach</b> (since Oct. 2018) <b>Studienstiftung des deutschen Volkes</b> (Jan. 2010 – Feb. 2018)

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### PROFESSIONAL EXPERIENCE

Since Oct. 2019	Long term visitor Mathematical institute, University of Oxford
Oct. 2018 – Sept. 2019	Postdoctoral Researcher Physique Théorique et Mathématique, Université Libre de Bruxelles
Feb. 2018 – Sept. 2018	Postdoctoral Researcher Institut für theoretische Physik, Ruprecht-Karls-Universität Heidelberg

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## EDUCATION

- Mar. 2014 – Feb. 2018    PhD studies in physics (Heidelberg university) on the subject  
*Cohomologies of coherent sheaves and massless spectra in F-theory*  
Supervisor physics: Prof. Dr. Timo Weigand (Uni. Heidelberg)  
Supervisor mathematics: Prof. Dr. Mohamed Barakat (Uni. Siegen)  
Result: Magna cum laude (very good)
- Sept. 2012 – Feb. 2014    Master studies in physics (Heidelberg university) on the subject  
*Cohomologies of holomorphic line bundles in smooth and compact normal toric varieties*  
Supervisor: Prof. Dr. Timo Weigand  
Result: 1.0
- Oct. 2008 – Aug. 2012    Bachelor studies in physics (Heidelberg university) on the subject  
*Intersecting D6-brane models on  $T^2 \times T^2 \times T^2/(\sigma \times \Omega)$  and  $T^2 \times T^2 \times T^2/(\mathbb{Z}_2 \times \mathbb{Z}_2 \times \sigma \times \Omega)$  orientifolds*  
Supervisor: Prof. Dr. Timo Weigand  
Result: 1.1
- Oct. 2010 – June 2011    Studies abroad at Imperial College (London, United Kingdom)
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## SOFTWARE DEVELOPMENT

I develop software via **github**. My scientific interest focuses on a collection of software packages which facilitate computations of sheaf cohomologies on toric varieties, see <https://github.com/homalg-project/SheafCohomologyOnToricVarieties>. These packages are written in the language **gap**, several of which designed as interfaces to C++-projects. Among others I am author of the following packages:

- TopcomInterface
- cohomCalcInterface
- SpasmInterface
- ToricVarieties
- FreydCategories
- SheafCohomologyOnToricVarieties

For a complete overview of my software developments take a look at my **GitHub-site** <https://github.com/HereAround> or my **academic website** <https://martinbies.github.io/>.

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## SCIENTIFIC PUBLICATIONS

- *Tensor products of finitely presented functors* (arXiv-ID: 1909.00172)  
Collaborator: Sebastian Posur
- *Cohomologies of coherent sheaves and massless spectra in F-theory* (arXiv-ID: 1802.08860)
- *Algebraic Cycles and Local Anomalies in F-theory* (arXiv-ID: 1706.08528)  
Collaborators: Christoph Mayrhofer and Timo Weigand
- *Gauge Backgrounds and Zero-Mode Counting in F-theory* (arXiv-ID: 1706.04616)  
Collaborators: Christoph Mayrhofer and Timo Weigand
- *Chow groups, Deligne cohomology and massless matter in F-theory* (arXiv-ID: 1402.5144)  
Collaborators: Christoph Mayrhofer, Christian Pehle and Timo Weigand

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## CONFERENCES

Sept. 2019	strings and geometry (Oxford, United Kingdom)
Aug. 2019	gap singular meeting and school (Lambrecht, Germany)
July 2019	Strings (Brussels, Belgium)
Aug. 2018	CAP_days 2018 (Siegen, Germany)
May 2018	Kontaktseminar – Schwerpunkt Banken und Beratung (Bonn, Germany)
May 2018	Physiker im Beruf (Bad Honnef, Germany)
Mar. 2018	string_data 2018 (Munich, Germany)
Jul. 2017	String Pheno 2017 (Virginia, USA)
Dec. 2015	String Math (Sanya, China)
Sept. 2015	Third GAP Days (Trondheim, Norway)
Mar. 2015	Second GAP Days (Aachen, Germany)
Feb. 2015	Physics and Geometry of F-theory (Munich, Germany)
Dec. 2014	Homological Perturbation Theory (Galway, Ireland)
Aug. 2014	GAP Days (Aachen, Germany)
Feb. 2014	Geometry and Physics of String Compactifications (Heidelberg, Germany)

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## TEACHING EXPERIENCE

Apr. 2018 – Oct. 2018	Senior tutor	methods of mathematical physics 1
Oct. 2016 – Mar. 2017	Tutor	theoretical physics I
Apr. 2016 – Sept. 2016	Senior tutor	General relativity
Apr. 2015 – Sept. 2015	Tutor	theoretical physics IV
Oct. 2014 – Mar. 2015	Tutor	Quantum field theory
Oct. 2013 – Mar. 2014	Tutor	theoretical physics III
Apr. 2013 – Sept. 2013	Tutor	theoretical physics II
Oct. 2012 – Mar. 2013	Tutor	theoretical physics I

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## ENGAGEMENT AT *Studienstiftung des deutschen Volkes*

June 2018	Member of the admission board <i>Heidelberg</i>
Dec. 2017	Member of the admission board <i>Ellwangen III</i>
May 2017	Training for admission board members – successfully completed
Nov. 2016	Member of the admission board <i>Heidelberg</i>