

## Ian Jauslin

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## Positions

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2018–present	<b>NSF Postdoctoral Fellow</b> (Mathematical Sciences Postdoctoral Research Fellowship) at the <b>Department of Physics of Princeton University</b> (Princeton, New Jersey, USA).
2016–2018	<b>Member of the School of Mathematics</b> at the <b>Institute for Advanced Study</b> (Princeton, New Jersey, USA).
2016	Postdoctoral appointment in the <b>Department of Mathematics</b> of the <b>University of Zurich</b> (Zurich, Switzerland).

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## Education

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2012–2016	<b>PhD in Physics</b> at the <b>Università degli studi di Roma “La Sapienza”</b> (Rome, Italy) under the supervision of <b>Alessandro Giuliani</b> .
2010–2012	<b>Master’s degree in Physics</b> with a major in Quantum Physics at the <b>Ecole Normale Supérieure de Paris</b> (France).
2009–2010	<b>Bachelor’s degree in Physics</b> at the <b>Ecole Normale Supérieure de Paris</b> (France).
2007–2009	<b>Classes Préparatoires aux Grandes Ecoles MPSI-MP*</b> at <b>Lycée Carnot</b> Dijon, France (equivalent to the first two years of university, preparing the admission exams to higher-education schools).

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## Grants

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2018–2021	<b>NSF</b> Mathematical Sciences Postdoctoral Research Fellowship, DMS-1802170.
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## Publications

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Preprints	<i>Analysis of a simple equation for the ground state energy of the Bose gas,</i> with <b>E. Carlen, E.H. Lieb</b> , arXiv: <a href="https://arxiv.org/abs/1912.04987">1912.04987</a> .
	<i>Exact solution of the Schrodinger equation for photoemission from a metal,</i> with <b>O. Costin, R. Costin, J.L. Lebowitz</b> , arXiv: <a href="https://arxiv.org/abs/1911.00201">1911.00201</a> .

Published

*Plate-Nematic phase in three dimensions,*  
with **M. Disertori, A. Giuliani,**  
to appear in **Communications in Mathematical Physics**, 2019  
doi:[10.1007/s00220-019-03543-z](https://doi.org/10.1007/s00220-019-03543-z), arXiv:[1805.05700](https://arxiv.org/abs/1805.05700).

*Solution of the time dependent Schrodinger equation leading to Fowler-Nordheim field emission,*  
with **O. Costin, R. Costin, J.L. Lebowitz,**  
**Journal of Applied Physics**, volume 124, number 213104, 2018  
doi:[10.1063/1.5066240](https://doi.org/10.1063/1.5066240), arXiv:[1808.00936](https://arxiv.org/abs/1808.00936).

*Liquid Crystals and the Heilmann-Lieb model,*  
**International Association of Mathematical Physics News Bulletin**,  
April 2018  
<http://www.iamp.org/bulletins/old-bulletins/Bulletin-April2018-print.pdf>.

*High-fugacity expansion, Lee-Yang zeros and order-disorder transitions in hard-core lattice systems,*  
with **J.L. Lebowitz,**  
**Communications in Mathematical Physics**, volume 364, issue 2, pages 655-682, 2018  
doi:[10.1007/s00220-018-3269-7](https://doi.org/10.1007/s00220-018-3269-7), arXiv:[1708.01912](https://arxiv.org/abs/1708.01912).

*Nematic liquid crystal phase in a system of interacting dimers and monomers,*  
with **E.H. Lieb,**  
**Communications in Mathematical Physics**, volume 363, issue 3, pages 955-1002, 2018  
doi:[10.1007/s00220-018-3237-2](https://doi.org/10.1007/s00220-018-3237-2), arXiv:[1709.05297](https://arxiv.org/abs/1709.05297).

*Crystalline ordering and large fugacity expansion for hard core lattice particles,*  
with **J.L. Lebowitz,**  
**Journal of Physical Chemistry B**, volume 122, number 13, pages 3266-3271, 2018  
doi:[10.1021/acs.jpcc.7b08977](https://doi.org/10.1021/acs.jpcc.7b08977), arXiv:[1705.02032](https://arxiv.org/abs/1705.02032).

*Topological phase transitions and universality in the Haldane-Hubbard model,*  
with **A. Giuliani, V. Mastropietro, M. Porta,**  
**Physical Review B**, volume 94, issue 20, number 205139, 2016  
doi:[10.1103/PhysRevB.94.205139](https://doi.org/10.1103/PhysRevB.94.205139), arXiv:[1605.07407](https://arxiv.org/abs/1605.07407).

*A Pfaffian formula for monomer-dimer partition functions,*  
with **A. Giuliani, E.H. Lieb,**  
**Journal of Statistical Physics**, volume 163, issue 2, pages 211-238, 2016  
doi:[10.1007/s10955-016-1484-1](https://doi.org/10.1007/s10955-016-1484-1), arXiv:[1510.05027](https://arxiv.org/abs/1510.05027).

*The ground state construction of bilayer graphene,*  
with **A. Giuliani,**  
**Reviews in Mathematical Physics**, volume 28, issue 8, number 1650018, 2016  
doi:[10.1142/S0129055X16500185](https://doi.org/10.1142/S0129055X16500185), arXiv:[1507.06024](https://arxiv.org/abs/1507.06024).

*Kondo effect in the hierarchical s-d model,*  
with **G. Gallavotti,**  
**Journal of Statistical Physics**, volume 161, issue 5, pages 1231-1235, 2015  
doi:[10.1007/s10955-015-1370-2](https://doi.org/10.1007/s10955-015-1370-2), arXiv:[1507.05678](https://arxiv.org/abs/1507.05678).

*Kondo effect in a fermionic hierarchical model*,  
with **G. Benfatto**, **G. Gallavotti**,  
**Journal of Statistical Physics**, volume 161, issue 5, pages 1203-1230, 2015  
doi:[10.1007/s10955-015-1378-7](https://doi.org/10.1007/s10955-015-1378-7), arXiv:[1506.04381](https://arxiv.org/abs/1506.04381).

In preparation

*The perturbative expansion of the quantum Heisenberg model*,  
with **N. Benedikter**.

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## Software

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**libinum**: a C library for high-precision numerical computations  
<http://ian.jauslin.org/software/libinum>.

**meankondo**: a tool to compute and manipulate flow equations for Fermionic hierarchical models  
<http://ian.jauslin.org/software/meankondo>.

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## Conference talks

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**Invited participant** at the *Oberwolfach Workshop 41-2019* in Oberwolfach, Germany, September 2019

**Contributed talk** at the *Great Lake Mathematical Physics Meeting* in Oberlin, Ohio, USA, June 2019

**Invited speaker** at *Mathematical Physics at the Crossings* in VirginiaTech, Virginia, USA, May 2019

**Invited speaker** at the *121st Statistical Mechanics Meeting* in Rutgers, New Jersey, USA, May 2019

**Contributed talk** at the *International Congress on Mathematical Physics* in Montreal, Quebec, Canada, July 2018

**Invited speaker** at the *Conference celebrating Elliott Lieb's work* in Princeton University, New Jersey, USA, April 2018

**Contributed talk** at *Mathematical Challenges in Quantum Mechanics* in Rome, Italy, February 2018

**Invited speaker** at the *118th Statistical Mechanics Meeting* in Rutgers, New Jersey, USA, December 2017

**Plenary speaker** at the *Great Lakes Mathematical Physics Meeting 2017* in East Lansing, Michigan, USA, June 2017

**Contributed talk** at the *117th Statistical Mechanics Meeting* in Rutgers, New Jersey, USA, May 2017

**Invited speaker** at *Qmath 13* in GeorgiaTech, Atlanta, Georgia, USA, October 2016.

**Invited speaker** at the *Oberwolfach workshop 1637* in Oberwolfach, Germany, September 2016.

**Invited participant** at the *Oberwolfach workshop 1630* in Oberwolfach, Germany, July 2016.

**Contributed talk** at the *XVIII International Congress of Mathematical Physics* Santiago, Chile, July 2015.

**Invited speaker** at *Trails in Quantum Mechanics and Surroundings* Como, Italy, July 2015.

**Contributed talk** at the *112th Statistical Mechanics Meeting* in Rutgers, New Jersey, USA, December 2014

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## Seminar talks

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*Michigan State University*, East Lansing, Michigan, USA, May 2019

*GeorgiaTech*, Atlanta, Georgia, USA, Feb 2019

*Princeton University*, New Jersey, USA, Nov 2018

*Yale University*, New Haven, Connecticut, USA, Oct 2018

*Harvard University*, Boston, Massachusetts, USA, Oct 2018

*Rutgers University*, New Jersey, USA, Sep 2018

*VirginiaTech*, Virginia, USA, Mar 2018

*Princeton University*, New Jersey, USA, Feb 2018

*GeorgiaTech*, Atlanta, Georgia, USA, Nov 2017

*Institute for Advanced Study*, Princeton, New Jersey, USA, Oct 2017

*Rutgers University*, Princeton, New Jersey, USA, Oct 2017

*Institute for Advanced Study*, Princeton, New Jersey, USA, Oct 2017

*Institute for Advanced Study*, Princeton, New Jersey, USA, Sep 2017

*Princeton University*, New Jersey, USA, Mar 2017

*Rutgers University*, USA, Sep 2016

*Institute for Advanced Study*, Princeton, USA, Sep 2016

*University of Zurich*, Switzerland, Mar 2016

*Copenhagen University*, Denmark, Jan 2016

## Service

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<b>Conference</b>	I have assisted in the organization of a number of Statistical Mechanics Meetings at Rutgers University, specifically SMM 112, 114, and 116 through 122, held between 2014 and 2019.
2017-2018	Co-organizer of the seminar series <i>Mathematical conversations</i> at the Institute for Advanced Study.
<b>Refereeing</b>	<i>International Journal of Modern Physics B</i> , <i>Journal of Statistical Physics</i> , <i>Probability Theory and Related Fields</i> , <i>Journal of Physics A</i> , <i>Mathematical Physics, Analysis and Geometry</i> .

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## Science outreach

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<b>Talks</b>	<i>Liquid crystals: order upon disorder</i> , Celebrating Ideas 2017-18, Institute for Advanced Study, Princeton, New Jersey, USA, April 2018.  <i>Liquid crystals and the Heilmann-Lieb conjecture</i> , Lunch with a Member, Institute for Advanced Study, Princeton, New Jersey, USA, April 2018.  <i>Liquid crystals and the Heilmann-Lieb conjecture</i> , Staff breakfast, Institute for Advanced Study, Princeton, New Jersey, USA, September 2017.  <i>Mathematics and Music: Vibrating strings and overtones</i> , Lunch with a Member, Institute for Advanced Study, Princeton, New Jersey, USA, March 2017.
<b>Publications</b>	<i>Liquid crystals and the Heilmann-Lieb conjecture</i> <b>The Institute Letter</b> , Fall 2017 issue <a href="https://www.ias.edu/ideas/2017/jauslin-liquid-crystals">https://www.ias.edu/ideas/2017/jauslin-liquid-crystals</a> .

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## Other publications

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*A Continuing Engagement with Endangered and Excluded Scholars*

with A. Crary, J. Heilbron,

**The Institute Letter**, Spring 2019 issue

<https://www.ias.edu/publications/institute-letter>

*The Institute's founding ethos in our precarious present; Einstein, plumbers and McCarthyism; Emmy Noether's Paradise*

with F. Bardawil, T. Dodman, P. Marichalar, K. Oschema, P. Redfield, (History Working Group),

**The Institute Letter**, Spring 2017 issue

<https://www.ias.edu/publications/institute-letter>

**Notices of the AMS**, volume 64, issue 10, November 2017,

doi: [10.1090/noti1596](https://doi.org/10.1090/noti1596).

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## Teaching experience

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2019            Lecturer for a section of PHY103 General Physics 1 at the *Department of Physics of Princeton University*.

2016            **Exercise classes** for an undergraduate (third year) course in mathematical physics at the *Department of Mathematics* of the *University of Zurich* (1 semester).

2013-2014      **Exercise classes** for an undergraduate (third year) course in mathematical physics at the *Mathematics and Physics* department of the *Università degli studi di Roma Tre* (2 semesters).

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## Computer skills

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I am proficient in  $\text{\LaTeX}$  and plain  $\text{\TeX}$ , and am comfortable with the version control system **git**.

I have been using Linux-based operating systems on a daily basis since 2013, and run **Arch Linux** on my personal computer and **Debian GNU/Linux** on my server. Before switching to Linux, I ran **Mac OS X**.

I have written software in **C**, **python**, **bash**, **C++**, **fortran** and **Objective-C**, and am proficient in using Unix-like command line interfaces.

I am also proficient in the **julia** language, which is designed for scientific numerical computations.

I have used the **SciPy** and **NumPy** modules, as well as **Maxima** and **Mathematica** for research purposes.

I am also proficient in web design, and am comfortable with **HTML5**, **javascript**, **php** and **SQL**.

I have been running and maintaining a server since 2012, on which I host a website (using **apache httpd** and **postgresql**), run an email server (**postfix** and **dovecot**), as well as a variety of web services, including DNS (**bind**), XMPP (**ejabberd**) servers and a VoIP platform (**Matrix**).

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## Languages

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<b>English:</b>	native language
<b>French:</b>	native language
<b>Spanish:</b>	fluent
<b>Italian:</b>	fluent
<b>German:</b>	school level (7 years)

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