

# Connor A. Occhialini

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## Education

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### Doctor of Philosophy, Physics

Massachusetts Institute of Technology, Cambridge, MA

- Advisor: Dr. Riccardo Comin

Sept. 2018 - present

### Bachelor of Science, Physics and Mathematics

University of Connecticut, Storrs, CT

- Honors Program, *Treibeck scholar, Summa Cum Laude*
- Thesis: “*Lattice Dynamical Origins of Structural Negative Thermal Expansion*”
- 3.972/4.000 cumulative GPA.
- Advisor: Dr. Jason Hancock

Aug. 2014- May 2018

## Professional Experience

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### Research Assistant

Photon Spectroscopy Laboratory, Department of Physics, University of Connecticut

- *Supervisor:* Dr. Jason Hancock
- Performed theoretical investigations of negative thermal expansion materials using classical, quantum and statistical mechanics and computer modeling/simulations (*PRB 2016, PRB 2017*)
- Gained experience with ultrafast optics, including the development of a time-domain thermo-reflectance apparatus for study of thermal and acoustic properties of condensed matter systems (*in progress*).
- Performed X-ray diffraction and inelastic X-ray scattering studies of lattice dynamics at a national laboratory beam line investigating the static and dynamical properties of negative thermal expansion materials (*PRM 2017*).

May 2015 - Aug. 2018

### Course Assistant

Department of Mathematics, University of Connecticut

- Course assistant for Introduction to Advanced Mathematics (Spring 2016), Analysis I (Spring 2018) and Analysis II (Spring 2018), all proof-based undergraduate mathematics courses.

Jan. 2016 - May 2018

## Publications

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- **Connor A. Occhialini**, Sahan U. Handunkanda, Gian G. Guzmán-Verri and Jason N. Hancock. “*Negative thermal expansion on the precipice of structural stability in open perovskites*”. *Frontiers in Physical Chemistry and Chemical Physics* (Invited, Submitted July 2018).
- **Connor A. Occhialini**, Sahan U. Handunkanda, Ayman Said, Sudhir Trivedi, Gian G. Guzmán-Verri and Jason N. Hancock. “*Negative thermal expansion near two structural quantum phase transitions*”. *Physical Review Materials* **1**, 070603(R) (18 December 2017). DOI: <https://doi.org/10.1103/PhysRevMaterials.1.070603>.
- **Connor A. Occhialini**, Sahan U. Handunkanda, Erin B. Curry and Jason N. Hancock. “*Classical, quantum and thermodynamics of a lattice model exhibiting structural negative thermal expansion*”. *Physical Review B* **95**, 094106 (10 March 2017). DOI: <https://doi.org/10.1103/PhysRevB.95.094106>.
- Sahan U. Handunkanda, **Connor A. Occhialini**, Ayman Said and Jason N. Hancock. “*Two dimensional nanoscale correlations in strong negative thermal expansion material ScF3*”. *Physical Review B* **94**, 214102 (7 December 2016). DOI: <https://doi.org/10.1103/PhysRevB.94.214102>.

## Publicity

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- Kim Krieger. “*Thermal Funkiness: Explaining the Unexpected*”. *UConn Today* (9 August 2017).

*Description:* A presentation of the results from the paper “*Classical, quantum and thermodynamics of a lattice model exhibiting negative thermal expansion*” to the general, university-wide audience.  
URL: <https://today.uconn.edu/2017/08/thermal-funkiness-explaining-unexpected>.

## Conference Talks and Poster Presentations

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- *Dynamic Quantum Matter*, Newport, RI.  
**Connor A. Occhialini**, Sahan U. Handunkanda and Jason N. Hancock. “*Experimental investigations of structural negative thermal expansion due to incipient lattice instabilities.*”  
Contributed Poster Presentation. June 2018.
- *APS March Meeting 2018*, Los Angeles, CA.  
**Connor A. Occhialini**, Sahan U. Handunkanda, Ayman Said, Sudhir Trivedi, Gian G. Guzmán-Verri and Jason N. Hancock. “*Negative thermal expansion near two structural quantum phase transitions*”.  
Contributed Oral Presentation. Abstract: <http://meetings.aps.org/Meeting/MAR18/Session/A44.10/>.
- *Frontiers in Undergraduate Research Poster Exhibition*, University of Connecticut.  
**Connor A. Occhialini**, Sudhir Trivedi, Ayman Said, Ahmet Alatas, Gian G. Guzmán-Verri and Jason N. Hancock. “*Inelastic X-ray scattering study of realized and incipient structural transitions in mercurous halides*”.  
Invited Poster Presentation. April 2017.
- *APS March Meeting 2017*, New Orleans, LA.  
**Connor A. Occhialini**, Sudhir Trivedi, Ayman Said, Ahmet Alatas and Jason N. Hancock. “*Inelastic X-ray scattering study of realized and incipient structural transitions in mercurous halides*”.  
Contributed Oral Presentation. Abstract: <http://meetings.aps.org/link/BAPS.2017.MAR.V20.12>.

## Awards and Honors

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- (2018) LeRoy Apker Award - Finalist (*American Physical Society, \$2000*)
- (2018) Katzenstein Prize (*Department of Physics, University of Connecticut, \$250*).
- (2017) Bernard Sippin Scholarship (*Department of Mathematics, University of Connecticut, \$7000*).
- (2016) Summer Undergraduate Research Fund Award, Treibeck Scholar (*University of Connecticut, \$3500*).
- (2015) Sigma Pi Sigma Inductee - National honor society for outstanding scholarship in physics.
- (Fall 2014-Spring 2018) College of Liberal Art’s and Sciences - Dean’s List (*University of Connecticut*).

## Skills

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**Computational:** Mathematica, Matlab, C++, and LaTeX.

**Laboratory:**

- Femtosecond optics: Class IV Ti:Sapphire laser operation, pulse compression, second harmonic generation, frequency-resolved optical gating;
- Ultra-high vacuum equipment operation;
- Labview programming;
- Sample preparation: Thermal evaporation of thin metallic films, single crystal polishing;
- X-rays: Diffractometry and inelastic scattering.

## Professional References

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- **Dr. Jason Hancock**, Assistant Professor, Department of Physics, University of Connecticut. Email: [jason.hancock@uconn.edu](mailto:jason.hancock@uconn.edu).
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- **Dr. Gayanath Fernando**, Professor, Department of Physics, University of Connecticut. Email: [gayanath.fernando@uconn.edu](mailto:gayanath.fernando@uconn.edu).
- **Dr. Thomas Blum**, Professor, Department of Physics, University of Connecticut. Email: [thomas.blum@uconn.edu](mailto:thomas.blum@uconn.edu).

Updated: September 1st, 2018