# NICHOLAS SMITH CONNOLLY

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# EDUCATION

University of	<b>Towa</b> , Iowa City, IA, United States		
<ul><li>PhD in Mathematics</li><li>M.S. in Mathematics</li></ul>		August 2021	
		May 2018	
Kenyon Colle B.A. i Minor	ege, Gambier, OH, United States n Mathematics and Physics, graduated cum laude in Philosophy, concentration in Scientific Computing	May 2015	
<b>RESEARCH EXP</b>	PERIENCE		
Postdoctoral	Researcher at INRIA Paris	2021 – present	
Advisor	Anthony Leverrier (Inria) and Nicolas Delfosse (Microsoft)	Paris, France	
Theme	Quantum error correction, LDPC codes, decoding algorithms		
Doctoral Stu	dent in Mathematics at the University of Iowa	2015 - 2021	
Advisor	Prof. Isabel Darcy	Iowa City, IA	
Theme	Topology, knot theory, graph theory, database development		
Thesis	Classification and Tabulation of 2-String Tangles: the Astronomy of Subtangle Decompositions		
Database	http://www.nick-connolly.com/tangles/tangles.php		
NSF-MSGI I	nternship at USACE Geospatial Research Laboratory	Summer 2020	
Advisor	Charlotte Ellison, USACE ERDC Researcher (remotely)	Alexandria, VA	
Theme	Data science, multi-modal time series analysis, graph theory	12 weeks	
<b>Research Int</b>	ernship with Japanese AI startup UsideU	Summer 2019	
Advisor	Dr. Alireza Goudarzi, Chief AI Officer at UsideU	Tokyo, Japan	
Theme	Machine learning, artificial intelligence, time series analysis	4 weeks	
PI4-IMA Int	ernship with American energy company Ameren	Summer 2019	
Advisor	Dr. Gui Maia, Senior Data Scientist at Ameren	Champaign, IL	
Theme	Data science, computer vision, optical character recognition	6 weeks	
Kenyon Coll	ege Summer Science Scholars Program	Summer 2014	
Advisor	Prof. Nuh Aydin	Gambier, OH	
Theme	Classical code construction, classical error correction	12 weeks	

#### PUBLICATIONS AND PREPRINTS

Connolly, N., Londe, V., Leverrier, A., and Delfosse, N. (2022). Fast erasure decoder for a class of quantum LDPC codes. ( <u>https://arxiv.org/abs/2208.01002</u> )	preprint 2022
Connolly, N. (2021). <i>Classification and tabulation of 2-string tangles: The astronomy of subtangle decompositions</i> (Doctoral dissertation, University of Iowa). (https://doi.org/10.17077/etd.005978)	2021
Connolly, N., and Ellison, C. (2020). Multimodal Community Detection Using Multi-Weighted Graphs.	preprint 2020
Aydin, N., Connolly, N., and Murphree, J. (2017). New binary linear codes from quasi-cyclic codes and an augmentation algorithm. <i>Appl. Algebra Eng. Commun. Comput.</i> , 28, 339–350. ( <u>https://doi.org/10.1007/s00200-017-0327-x</u> )	2017
Aydin, N., Connolly, N., and Grassl, M. (2017). Some results on the structure of constacyclic codes and new linear codes over GF(7) from quasi-twisted codes. <i>Adv. Math. Commun.</i> , <i>11(1)</i> , 245–258. (https://doi.org/10.3934/amc.2017016)	2017

## SELECTED CONFERENCE, WORKSHOP, AND SEMINAR PRESENTATIONS

<i>Fast Erasure Decoder for a Class of Quantum LDPC Codes</i> , talk given at the Workshop Codes NISQ2LSQ.	March 2023
<i>Fast Erasure Decoder for a Class of Quantum LDPC Codes</i> , poster presentation at the Conference on Quantum Information Processing 2023.	February 2023
An Introduction to Quantum Error Correction, invited tutorial given at the Quantum Information Center Sorbonne workshop in quantum information.	November 2022
An Introduction to Rational Tangles and Some of Their Generalizations, Kenyon College Math Monday invited virtual presentation.	February 2022
A Database of Tangles: Knot Theoretic Models for DNA Topology, virtual poster presentation at the 3 <sup>rd</sup> Annual SCMB Symposium.	December 2020
<i>Multimodal Community Detection Using Multi-Weighted Graphs</i> , presented as part of the NSF-MSGI Summer Research Virtual Presentation.	August 2020
<i>Using Artificial Intelligence to Automate Body Movement Analysis</i> , poster presentation at the Asian Conference on Machine Learning 2019 workshop on Statistics & Machine Learning Researchers in Japan; Nagoya, Japan.	November 2019
Exploring Industry as a Pure Mathematician: My Summer as a Data Scientist, given at the University of Iowa Mathematical Biology Seminar.	September 2019
<i>Tabulation and Classification of 2-String Tangles</i> , comprehensive examination, presented at the Mathematical Biology Seminar, student run Topology Seminar, and the Graduate and Undergraduate Student Seminar.	November 2018
<i>Constructing Linear Codes with Record Breaking Parameters</i> , presented at MAA MathFest 2014 conference in Portland, OR.	August 2014

### SCHOLARSHIPS, AWARDS, AND CERTIFICATES

University of Iowa Outstanding Teaching Assistant Award	Spring 2020	
UI Engaging Across Cultures professional development certificate	Fall 2019	
Kenyon College Distinguished Academic Scholar	Spring 2015	
TEACHING EXPERIENCE		
<ul> <li>Graduate teaching assistant in mathematics at the University of Iowa</li> <li>Spring 2021, MATH:5760: Mathematical Biology (graduate course)</li> <li>Fall 2020, MATH:1020: Elementary Functions (primary instructor)</li> <li>Spring 2020, MATH:1860: Calculus II</li> <li>Fall 2019, MATH:1850: Calculus I</li> <li>Spring 2019, MATH:1550: Calculus I (for engineering students)</li> <li>Fall 2018, MATH:1120: Logic of Arithmetic (college of education)</li> <li>Spring 2018, MATH:1010: Trigonometry (primary instructor)</li> <li>Fall 2017, MATH:1010: Trigonometry (primary instructor)</li> <li>Summer 2017, MATH:1050: College Algebra</li> <li>Spring 2017, MATH:1340: Precalculus (for pre-med students)</li> <li>Fall 2016, MATH:1460: Calculus I (for pre-business students)</li> <li>Fall 2015, MATH:1340: Precalculus (for pre-business students)</li> </ul>	2015 – 2021	
<ul> <li>Grader for the University of Iowa Mathematics Department</li> <li>Fall 2020, MATH:3600: Differential Equations</li> <li>Spring 2019, MATH:5010: Abstract Algebra II (graduate course)</li> <li>Fall 2018, MATH:2550: Linear Algebra (for engineering students)</li> </ul>	2018 - 2021	
General mathematics tutor at the University of Iowa	2015 - 2021	
SERVICE AND OUTREACH		
Webmaster for the University of Iowa SIAM Student Chapter	2020 - 2021	
Twice volunteer as a graduate student buddy-mentor for first year graduate students in the University of Iowa Mathematics Department.	2019 - 2020	
Volunteer at Lucas Elementary School Math Day, a day of mathematics activities with third graders organized by UI graduate students.	2017	
Volunteer in six iterations of LADS: Learning and Doing Science, a science outreach program for middle school students hosted at Kenyon College.	2012 - 2015	

#### **PROFESSIONAL MEMBERSHIPS**

2019 - 2021
2015 - 2021
2014 - 2021
2013 – present
2013 – present
2015 - 2016
2014 - 2015

## **COMPUTER SKILLS**

Basic	Advanced	Fluent
R, HTML, PHP, Julia, XPPAUT, LabVIEW, MultiSim, Maple	Python, C/C++, MySQL, MATLAB, Mathematica, Origin, Magma	LaTeX

# LANGUAGES

English	Native speaker
French	Approximately B2/C1 (CEFR) proficiency
Japanese	Approximately A2 (CEFR) / N4 (JLPT) proficiency
Spanish	Elementary proficiency (high school)

#### **PROFESSIONAL REFERENCES**

Name	Anthony Leverrier	Email	anthony.leverrier@inria.fr
Organization	INRIA Paris	Relationship	Postdoctoral Advisor, 2021–2023
Name	Nicolas Delfosse	Email	Nicolas.Delfosse@microsoft.com
Organization	Microsoft Quantum	Relationship	Postdoctoral Advisor, 2021–2023
Name	Prof. Isabel Darcy	Email	isabel-darcy@uiowa.edu
Organization	University of Iowa	Relationship	Doctoral Thesis Advisor, 2018–2021