

EDUCATION **Ph.D.** Paris, France
PARIS SACLAY UNIVERSITY 2012 - 2016

M.S. Grenoble, France
GRENOBLE INP - PHELMA 2009 - 2012

RESEARCH EXPERIENCES **University of Maryland - National Institute of Standards and Technology**

ASSISTANT RESEARCH SCIENTIST

- Study of chip-scale integrated micro-resonators made $\chi^{(3)}$ susceptible material for non-linear optics applications.
- Study of novel dispersion designs for broader, shorter wavelength, and new state of frequency combs in pulse regime
- Mentoring of students

Maryland, USA
Jul. 2021 - present

University of Maryland - National Institute of Standards and Technology

POSTDOCTORAL ASSOCIATE

- Study of chip-scale integrated micro-resonators made of Silicon Nitride for $\chi^{(3)}$ frequency comb applications.
- Development of in-house developed modelling tools, fabrication in clean-room, development of new experimental setups

Maryland, USA
Feb. 2017 - Jun. 2021

Thales Research and Technology

PHD CANDIDATE

- Study of carrier dynamics generated through $\chi^{(3)}$ non-linearity in III-V photonic crystals cavities
- Development of in-house computational solver (FDTD, FEM, CMT), fabrication and characterization through custom developed setups

Palaiseau, France
Dec. 2012 - Dec. 2016

ACADEMIC EXPERIENCE **Teaching**

- Teaching assistant – 1st and 2nd year undergraduate student – UNIVERSITY PARIS SACLAY – 2014

Mentoring

- Graduate Students: Edgar Perez – University of Maryland – 2018 → present
Tahmid Raman – University of Maryland – 2019 → present
Khoi Tuan Hoang – University of Maryland – 2020 → present
• Undergrad. Students: Dillion Cottrill – UNIVERSITY OF WEST VIRGINIA – 2020
Kristiana Ramos – UNIVERSITY OF MARYLAND – 2021 → present

Rahul Shresta – University of Maryland – 2020 → present
Pradyoth – UMBD (Prof. Menyuk's group) – 2021 → present
Michal C?? – University of Maryland – 2022 → present

Contribution to Funded Projects

- Agence National de la Recherche (France): AUCTOPUSS (2013-2015) – ETHAN (2015-2016)
- DARPA (USA): DODOS (2017-present) – ACES (2017-present) – Aphi (2019-present) – LUMOS (2021-present) – SAVaNT (2021-present)
- Space Force (USA): DODOS (2022-present)

SELECTED PUBLICATIONS **Articles**

- Xiyuan Lu, Gregory Moille, et al. *Efficient photoinduced second-harmonic generation in silicon nitride photonics*. NATURE PHOTONICS (2020).
- Gregory Moille, Lin Chang, et al. *Dissipative Kerr Solitons in a III-V Microresonator*. LASERS & PHOTONICS REVIEWS 14 (2020).
- Gregory Moille, Qing Li, et al. *pyLLE: A Fast and User Friendly Lugiato-Lefever Equation Solver*. JOURNAL OF RESEARCH OF THE NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY 124 (2019).
- Gregory Moille, Xiyuan Lu, et al. *Kerr-Microresonator Soliton Frequency Combs at Cryogenic Temperatures*. PHYSICAL REVIEW APPLIED 12 (2019).

>30 peer-reviewed journal articles

>32 conference proceedings

2 book chapters

583 citations as of 10/2021

h-index of 14 as of 10/2021

Book Chapter

- Grégory Moille et al. Green Photonics and Electronics. "Nanophotonic Approach to Energy-Efficient Ultra-Fast All-Optical Gates", pp. 107–137. Springer, Cham, 2017.

Conferences

- Gregory Moille et al. "Post-Processing Dispersion Engineering of Frequency Combs In Microresonator Addressing Atomic Clock". 2020 Conference on Lasers and Electro-Optics (CLEO). (2020).
- Gregory Moille et al. "Chip-Integrated Soliton Microcombs at Cryogenic Temperatures". Frontiers in Optics. (2019).
- Gregory Moille et al. "Phase-locked two-color soliton microcombs". 2018 Conference on Lasers and Electro-Optics (CLEO). (2018).

SERVICE TO COMMUNITY **Outreach**

- Maintaining and updating an active github profile to share scripts for experiment control and in-house developed simulations tools. Combined, they account for 16 forks, 15 stars and an average of 13 unique views per week.

Peer Reviewing

- Referee for Physical Review Letters, Physical Review Applied, Physical Review A, Physical Review Research, Nature Communications, Laser and Photonics Reviews, Optica, Optics Letters, Optics Express, OSA Continuum, Applied Physics Letters Photonics, Micromachine, SPIE Advanced Photonics

Review Committee Member

- Review applications for the Siegman international school on laser for the 2019 and 2020 editions

SKILLS
SUMMARY

Relevant Course Work

Electromagnetism ● ● ● ● ●
Non-Linear Optics ● ● ● ● ●
Optoelectronics ● ● ● ● ●
Quantum Physics ● ● ● ● ●

Experimental Skills

Photonics Charac. ● ● ● ● ●
Non-Linear Optics ● ● ● ● ●
Radio Freq. ● ● ● ● ●
Metrology ● ● ● ● ●

NanoFab

Design Layout ● ● ● ● ●
EBL ● ● ● ● ●
Dy Etching ● ● ● ● ●
Wet Etching ● ● ● ● ●

E.M. Modeling

Comsol ● ● ● ● ●
Lumerical ● ● ● ● ●
Mathematica ● ● ● ● ●
HFSS ● ● ● ● ●

Languages

English ● ● ● ● ●
French ● ● ● ● ●
Italian ● ● ● ● ●
Russian ● ● ● ● ●

Complete list of publications

POPULAR WRITING	Gregory Moille and Kartik Srinivasan. Small Cavities Make Noisy Homes for Light . <i>American Physical Society</i> VOL. 13 (2020). URL: HTTPS://PHYSICS.APS.ORG/ARTICLES/V13/192 (VISITED ON 12/12/2020)URL: HTTPS://PHYSICS.APS.ORG/ARTICLES/V13/192 .
SUBMITTED MANUSCRIPTS	Gregory Moille, Edgar F. Perez, Ashutosh Rao, Xiyuan Lu, Yanne K. Chembo, and Kartik Srinivasan. Two-Octave Dissipative Kerr Soliton Microcomb Through Synthetic Dispersion . – To Be Published. Feng Zhou, Xiyuan Lu, Ashutosh Rao, Jordan Stone, Gregory Moille, Edgar Perez, Daron Westly, and Kartik Srinivasan. Hybrid-Mode-Family Kerr Optical Parametric Oscillation for Robust Coherent Light Generation on Chip . – To Be Published. Jordan R. Stone, Gregory Moille, Xiyuan Lu, and Kartik Srinivasan. Conversion Efficiency in Kerr Microresonator Optical Parametric Oscillators: From Three Modes to Many Modes . – To Be Published. Gregory Moille, Daron Westly, Gregory Simelgor, and Kartik Srinivasan. Impact of Stoichiometric Silicon Nitride Growth Conditions on Dispersion Engineering of Broadband Microresonator Frequency Combs . – To Be Published.
JOURNAL ARTICLES	Travis C. Briles, Su-Peng Yu, Lin Chang, Chao Xiang, Joel Guo, David Kinghorn, Gregory Moille, Kartik Srinivasan, John E. Bowers, and Scott B. Papp. Hybrid InP and SiN Integration of an Octave-Spanning Frequency Comb . <i>APL PHOTONICS</i> 6 (2021). Su-Peng Yu, Daniel C. Cole, Hojoong Jung, Gregory T. Moille, Kartik Srinivasan, and Scott B. Papp. Spontaneous Pulse Formation in Edgeless Photonic Crystal Resonators . <i>NATURE PHOTONICS</i> 15 (2021). Sunil Mittal, Gregory Moille, Kartik Srinivasan, Yanne K. Chembo, and Mohammad Hafezi. Topological Frequency Combs and Nested Temporal Solitons . <i>NATURE PHYSICS</i> 17 (2021). Xiyuan Lu, Gregory Moille, Ashutosh Rao, and Kartik Srinivasan. Proposal for Noise-Free Visible-Telecom Quantum Frequency Conversion through Third-Order Sum and Difference Frequency Generation . <i>OPTICS LETTERS</i> 46 (2021). Gregory Moille, Daron Westly, Ndubuisi George Orji, and Kartik Srinivasan. Tailoring Broadband Kerr Soliton Microcombs via Post-Fabrication Tuning of the Geometric Dispersion . <i>APPLIED PHYSICS LETTERS</i> 119 (2021). Qing Li, Gregory Moille, Hossein Taheri, Ali Adibi, and Kartik Srinivasan. Improved coupled-mode theory for high-index-contrast photonic platforms . <i>PHYS. REV. A</i> 102 (6 2020). Xiyuan Lu, Gregory Moille, Ashutosh Rao, and Kartik Srinivasan. Proposal for noise-free visible-telecom quantum frequency conversion through third-order sum and difference frequency generation . <i>ARXIV PREPRINT ARXIV:2010.06811</i> (2020). Xiyuan Lu, Gregory Moille, Ashutosh Rao, Daron A Westly, and Kartik Srinivasan. Efficient photoinduced second-harmonic generation in silicon nitride photonics . <i>NATURE PHOTONICS</i> (2020). Xiyuan Lu, Ashutosh Rao, Gregory Moille, Daron A Westly, and Kartik Srinivasan. Universal frequency engineering tool for microcavity non-linear optics: multiple selective mode splitting of whispering-gallery resonances . <i>PHOTONICS RESEARCH</i> 8 (2020). Gregory Moille, Lin Chang, Weiqiang Xie, Ashutosh Rao, Xiyuan Lu, Marcelo Davanco, John E Bowers, and Kartik Srinivasan. Dissipative Kerr Solitons in a III-V Microresonator . <i>LASERS & PHOTONICS REVIEWS</i> 14 (2020). Lin Chang, Weiqiang Xie, Haowen Shu, Qi-Fan Yang, Boqiang Shen, Andreas Boes, Jon D Peters, Warren Jin, Chao Xiang, Songtao Liu, et al. Ultra-efficient frequency comb generation in AlGaAs-on-insulator microresonators . <i>NATURE COMMUNICATIONS</i> 11 (2020). Edgar Perez, Gregory Moille, Xiyuan Lu, Daron Westly, and Kartik Srinivasan. Automated On-Axis Direct Laser Writing of Coupling Elements for Photonic Chips . <i>OPTICS EXPRESS</i> 28 (2020). Gregory Moille, Qing Li, Lu Xiyuan, and Kartik Srinivasan. pyLLE: A Fast and User Friendly Lugiato-Lefever Equation Solver . <i>JOURNAL OF RESEARCH OF THE NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY</i> 124 (2019). Inès Ghorbel, François Swiadek, Rui Zhu, Daniel Dolfi, Gaëlle Lehoucq, Aude Martin, Grégory Moille, Loïc Morvan, Rémy Braive, Sylvain Combré, et al. Optomechanical gigahertz oscillator made of a two photon absorption free piezoelectric III/V semiconductor . <i>APL PHOTONICS</i> 4 (2019). Xiyuan Lu, Gregory Moille, Anshuman Singh, Qing Li, Daron A Westly, Ashutosh Rao, Su-Peng Yu, Travis C Briles, Scott B Papp, and Kartik Srinivasan. Milliwatt-threshold visible-telecom optical parametric oscillation using silicon nanophotonics . <i>OPTICA</i> 6 (2019). Su-Peng Yu, Travis C Briles, Gregory T Moille, Xiyuan Lu, Scott A Diddams, Kartik Srinivasan, and Scott B Papp. Tuning Kerr-soliton frequency combs to atomic resonances . <i>PHYSICAL REVIEW APPLIED</i> 11 (2019). Gregory Moille, Xiyuan Lu, Ashutosh Rao, Qing Li, Daron A Westly, Leonardo Ranzani, Scott B Papp, Mohammad Soltani, and Kartik Srinivasan. Kerr-Microresonator Soliton Frequency Combs at Cryogenic Temperatures . <i>PHYSICAL REVIEW APPLIED</i> 12 (2019). Xiyuan Lu, Gregory Moille, Qing Li, Daron A Westly, Anshuman Singh, Ashutosh Rao, Su-Peng Yu, Travis C Briles, Scott B Papp, and Kartik Srinivasan. Efficient telecom-to-visible spectral translation through ultralow power nonlinear nanophotonics . <i>NATURE PHOTONICS</i> 13 (2019). Xiyuan Lu, Qing Li, Daron A Westly, Gregory Moille, Anshuman Singh, Vikas Anant, and Kartik Srinivasan. Chip-integrated visible-telecom entangled photon pair source for quantum communication . <i>NATURE PHYSICS</i> 15 (2019).

- Gregory Moille, Qing Li, Travis C Briles, Su-Peng Yu, Tara Drake, Xiyuan Lu, Ashutosh Rao, Daron Westly, Scott B Papp, and Kartik Srinivasan. *Broadband resonator-waveguide coupling for efficient extraction of octave-spanning microcombs*. OPTICS LETTERS 44 (2019).
- Chad Husko, Joohoon Kang, Gregory Moille, Joshua D Wood, Zheng Han, David Gosztola, Xuedan Ma, Sylvain Combrié, Alfredo De Rossi, Mark C Hersam, et al. *Silicon-Phosphorene Nanocavity-Enhanced Optical Emission at Telecommunications Wavelengths*. NANO LETTERS 18 (2018).
- Gregory Moille, Sylvain Combrié, Laurence Morgenroth, Gaëlle Lehoucq, Sébastien Sauvage, Moustafa El Kurdi, Philippe Boucaud, Alfredo de Rossi, and Xavier Checoury. *Nonlinearities in gas cavities with high cw input powers enabled by photo-oxidation quenching through ad encapsulation*. OPTICS EXPRESS 26 (2018).
- Gregory Moille, Qing Li, Sangsik Kim, Daron Westly, and Kartik Srinivasan. *Phased-locked two-color single soliton microcombs in dispersion-engineered Si₃N₄ resonators*. OPTICS LETTERS 43 (2018).
- Sylvain Combrié, Gaëlle Lehoucq, Grégory Moille, Aude Martin, and Alfredo De Rossi. *Comb of high-Q Resonances in a Compact Photonic Cavity*. LASER & PHOTONICS REVIEWS 11 (2017).
- Gregory Moille, Sylvain Combrié, Kerstin Fuchs, Matusala Jacob, Johann Peter Reithmaier, and Alfredo de Rossi. *Acceleration of the nonlinear dynamics in p-doped indium phosphide nanoscale resonators*. OPTICS LETTERS 42 (2017).
- Gregory Moille, Sylvain Combrié, Laurence Morgenroth, Gaëlle Lehoucq, François Neuilly, Bowen Hu, Didier Decoster, and Alfredo de Rossi. *Integrated all-optical switch with 10 ps time resolution enabled by ALD*. LASER & PHOTONICS REVIEWS 10 (2016).
- Mathilde Gay, Laurent Bramerie, Luiz Anet Neto, Sy Dat Le, Jean-Claude Simon, Christophe Peucheret, Zheng Han, Xavier Checoury, Grégory Moille, Jérôme Bourderionnet, et al. *Silicon-on-insulator RF filter based on photonic crystal functions for channel equalization*. IEEE PHOTONICS TECHNOLOGY LETTERS 28 (2016).
- Gregory Moille, Sylvain Combrié, and Alfredo De Rossi. *Modeling of the carrier dynamics in nonlinear semiconductor nanoscale resonators*. PHYSICAL REVIEW A 94 (2016).
- Zheng Han, Grégory Moille, Xavier Checoury, Jérôme Bourderionnet, Philippe Boucaud, Alfredo De Rossi, and Sylvain Combrié. *High-performance and power-efficient 2 \times 2 optical switch on silicon-on-insulator*. OPTICS EXPRESS 23 (2015).
- Daivid Fowler, Salim Boutami, Matthieu Duperron, Gregory Moille, Giacomo Badano, François Boulard, Johan Rothman, Olivier Gravrand, and Roch Espiau de Lamaestre. *Partially localized hybrid surface plasmon mode for thin-film semiconductor infrared photodetection*. OPTICS LETTERS 38 (2013).

BOOK CHAPTERS

- P Colman, S Combrié, A De Rossi, A Martin, and G Moille. *Nonlinear Meta-Optics. "Nonlinear Photonic Crystals", pp. 199–250*. CRC Press, 2020.
- Grégory Moille, Sylvain Combrié, and Alfredo De Rossi. *Green Photonics and Electronics. "Nanophotonic Approach to Energy-Efficient Ultra-Fast All-Optical Gates", pp. 107–137*. Springer, Cham, 2017.

CONFERENCE PROCEEDINGS

- Xiyuan Lu et al. *"Efficient widely-separated optical parametric oscillation"*. 2020 Conference on Lasers and Electro-Optics (CLEO). (2020).
- Su-Peng Yu et al. *"Spontaneous Soliton Formation in Photonic-Crystal Ring Resonators"*. 2020 Conference on Lasers and Electro-Optics (CLEO). (2020).
- TC Briles et al. *"Semiconductor laser integration for octave-span Kerr-soliton frequency combs"*. 2020 Conference on Lasers and Electro-Optics (CLEO). (2020).
- Ashutosh Rao et al. *"Integrated photonic interposers for processing octave-spanning microresonator frequency combs"*. CLEO: Science and Innovations. (2020).
- Gregory Moille et al. *"Stable Dissipative Kerr Solitons in a AlGaAs Microresonator Through Cryogenic Operation"*. 2020 Conference on Lasers and Electro-Optics (CLEO). (2020).
- Jennifer A Black et al. *"Optical synthesis by spectral translation"*. 2020 Conference on Lasers and Electro-Optics (CLEO). (2020).
- Xiyuan Lu et al. *"Efficient second harmonic generation in a Si₃N₄ microring"*. CLEO: Science and Innovations. (2020).
- Gregory Moille et al. *"Post-Processing Dispersion Engineering of Frequency Combs In Microresonator Addressing Atomic Clock"*. 2020 Conference on Lasers and Electro-Optics (CLEO). (2020).
- Su-Peng Yu et al. *"Direct Mode-Frequency Control for Nonlinear Optics in Photonic-Crystal Ring Resonators"*. CLEO: Science and Innovations. (2019).
- Xiyuan Lu et al. *"Efficient telecom-to-visible spectral translation using silicon nanophotonics"*. CLEO: Science and Innovations. (2019).
- Gregory Moille et al. *"Broadband Resonator-Waveguide Coupling for Octave-Spanning Microresonator Frequency Combs"*. Frontiers in Optics. (2019).
- Xiyuan Lu et al. *"Sub-mW optical parametric oscillation across visible and telecommunications bands using silicon nanophotonics"*. Laser Science. (2019).
- Gregory Moille et al. *"pyLLE: a Fast and User Friendly Software Package for Microcomb Simulations"*. Frontiers in Optics. (2019).
- Gregory Moille et al. *"Chip-Integrated Soliton Microcombs at Cryogenic Temperatures"*. Frontiers in Optics. (2019).

- Travis C Briles et al. *“Generation of Octave-Spanning Microresonator Solitons with a Self Injection-Locked DFB Laser”*. 2019 IEEE Avionics and Vehicle Fiber-Optics and Photonics Conference (AVFOP). (2019).
- Xiyuan Lu et al. *“Visible-telecom photon pair generation with silicon nitride nanophotonics”*. CLEO: QELS_Fundamental Science. (2018).
- Gregory Moille et al. *“Phase-locked two-color soliton microcombs”*. 2018 Conference on Lasers and Electro-Optics (CLEO). (2018).
- Su-Peng Yu et al. *“Bridging Telecom Wavelengths to Alkali Atomic Transitions with Tunable Kerr Frequency Combs”*. Frontiers in Optics. (2018).
- Sylvain Combrié et al. *“High-Q optical comb based on a photonic harmonic potential (Conference Presentation)”*. Quantum Sensing and Nano Electronics and Photonics XV. (2018).
- Gregory Moille. *“Parametric Interactions with Microwatt Pump In III/V Resonators”*. Integrated Photonics Research, Silicon and Nanophotonics. (2017).
- C Husko et al. *“A hybrid silicon-phosphorene nanolaser”*. Frontiers in Optics. (2017).
- Grégory Moille, Alfredo De Rossi, and Sylvain Combrié. *“All-optical gates based on photonic crystal resonators”*. SPIE Photonics Europe. (2016).
- Gregory Moille et al. *“GaAs photonic crystal switch for electro-optic sampling”*. 2016 Conference on Lasers and Electro-Optics (CLEO). (2016).
- Alfredo De Rossi. *“High-Q photonic crystal resonators for nonlinear optics”*. Frontiers in Optics. (2016).
- Jérôme Bourderionnet et al. *“Silicon-on-Insulator photonic crystal multi-tap microwave photonics filter”*. 2016 IEEE Photonics Conference (IPC). (2016).
- Aude Martin et al. *“Triply-resonant continuous wave parametric source with a microwatt pump”*. 2016 Conference on Lasers and Electro-Optics (CLEO). (2016).
- Grégory Moille et al. *“Recovery time control in a nanophotonic nonlinear gate using atomic layer deposition”*. CLEO: Science and Innovations. (2015).
- Zheng Han et al. *“High contrast and power-efficient thermally-controlled optical switch on Silicon-on-Insulator”*. CLEO: Science and Innovations. (2015).
- Gregory Moille et al. *“Towards faster InP photonic crystal all-optical-gates”*. 2015 International Conference on Photonics in Switching (PS). (2015).
- Gregory Moille et al. *“A Highly Linear All Optical Gate Based on Coupled Photonic Crystal Cavities”*. Nonlinear Photonics. (2014).
- Sylvain Combrié et al. *“An efficient all-optical gate based on photonic crystals cavities and applications”*. 2014 16th International Conference on Transparent Optical Networks (ICTON). (2014).
- G Moille et al. *“Photo-commutateur hyperfréquence à base de cristaux photoniques”*. Assemblée Générale du GdR Ondes 2451” Interférences d’ondes”. (2013).

OTHERS

- John E Bowers, Andreas Beling, Steven M Bowers, Travis C Briles, Lin Chang, Jeff Chiles, Robert Costanzo, Marcelo Davanco, Scott A Diddams, Tara E Drake, et al. *Chip-scale optical resonator enabled synthesizer (CORES)* Tech. Report . 2019.
- Grégory Moille. *“Non-Linear Dynamics in Semiconductor Nano-Structures for Signal Processing”* PhD Thesis . 2016.

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2022
Washington, D.C.

