NSERC CREATE **TOP-SET** Un programme *FONCER* du CRSNG

Séminaire

Le mardi 18 décembre 2018, 14h45
Des rafraîchissements seront servis dès 14h15
Complexe de recherche avancée, pièce 233
Université d'Ottawa, 25, rue Templeton
Le séminaire se déroulera en anglais.

Seminar

Tuesday, December 18, 2018, 2:45 p.m.
Refreshments to be served starting at 2:15 p.m.
Advanced Research Complex, room 233
University of Ottawa, 25 Templeton Street

Radiative cooling for enhanced performance and reliability of photovoltaics

Peter Bermel, Purdue University

Abstract: Radiative cooling is a uniquely compact and passive cooling mechanism. Significant applications can be found in energy generation, particularly concentrating photovoltaics and thermophotovoltaics. Both rely on low-bandgap photovoltaic cells that underperform at elevated temperatures. Here, I will present an experiment enhancing radiative cooling for low-bandgap photovoltaic cells under concentrated sunlight. A composite material stack is used as the radiative cooler. Enhanced radiative cooling reduces operating temperatures by 10 °C, translating into a relative increase of 5.7% in open-circuit voltage and an estimated increase of 40% in lifetime at 37 suns. This demonstrated radiative cooling enhancement is a simple and straightforward approach that can be generalized to other optoelectronic systems.

Bio: Dr. Peter Bermel is an associate professor of Electrical and Computer Engineering at Purdue University. His research focuses on improving the performance of photovoltaic, thermophotovoltaic, and nonlinear systems using the principles of nanophotonics. Key enabling techniques for his work include electromagnetic and electronic theory, modeling, simulation, fabrication, and characterization. Dr. Bermel is widely published in scientific peer-reviewed journals, and his work has been a recurring topic in international educational activities as well as publications geared towards the general public. His work, which has been cited over 5600 times, for an h-index value of 28, includes the following topics: understanding and optimizing the detailed mechanisms of light trapping in thin-film photovoltaics; fabricating and characterizing 3D inverse opal photonic crystals made from silicon for photovoltaics, and comparing to theoretical predictions; explaining key physical effects influencing selective thermal emitters in order to achieve high performance thermophotovoltaic systems; designing photon recycling for high-efficiency incandescent lighting; and characterizing behavior and outcomes for learners in online nanophotonic courses using big data analytics.

TOP-SET est un programme de formation FONCER du CRSNG en puissance optoélectronique ayant pour but de façonner une cohorte de personnel hautement qualifié détenant des connaissances approfondies en systèmes optoélectroniques pour joindre les rangs d'équipes de recherche et développement.

Pour de plus amples renseignements sur TOP-SET, veuillez consulter create-topset.eecs.uottawa.ca/fr.

NSERC CREATE Training in Optoelectronics for Power: from Science and Engineering to Technology (**TOP-SET**) is a training program that aims to form a cohort of highly qualified personnel with comprehensive understanding of optoelectronic systems, capable of joining advanced R&D teams.

For further details regarding TOP-SET, go to create-topset.eecs.uottawa.ca.

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Le financement pour TOP-SET est fourni par le Conseil de recherches en sciences naturelles et génie.
TOP-SET is funded by the Natural Sciences and Engineering Research Council of Canada.

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Le financement pour ce séminaire est fourni par l'Université d'Ottawa.
This seminar is funded by the University of Ottawa.