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*En collaboration avec la Série de colloques du département de physique*  
*In collaboration with the Department of Physics Colloquium Series*

## Séminaire

Le jeudi 9 mars 2023, 14h45  
Des rafraîchissements seront servis dès 14h15.

ARC 233, [MS Teams](#)

\*Le séminaire se déroulera en anglais.\*

## Seminar

Thursday, March 9, 2023, 2:45 p.m.  
Refreshments to be served starting at 2:15 p.m.

ARC 233, [MS Teams](#)

### **Valley Photovoltaics: A New Approach Towards the Hot Carrier Solar Cell** **Ian R. Sellers, University of Oklahoma**

**Abstract:** Hot carrier solar cells are a proposed next-generation photovoltaic technology for overcoming the single-gap efficiency limit. Through maintenance of a population of high energy carriers and extraction at better than band gap photovoltage, an enhanced solar conversion efficiency could be maintained. Proof-of-principle has been demonstrated for hot carrier generation and maintenance, both by mitigating thermalization mechanisms through the creation of a phonon bottleneck, and through exploitation of intervalley scattering mechanisms to stabilize hot carriers in upper valleys of the band structure in the emerging field of valley photovoltaics (VPs). Intervalley scattering properties have been shown to provide an accessible pathway for VP operation. However, further development of this VP architecture is required to enhance solar cell operation that increases both the efficacy of carrier extraction from the satellite valleys, and the establishment of electric fields inside the device to provide lower energy carriers access to this upper valley extraction pathway.



**Bio:** Ian Sellers received his Bachelor's degree from the University of Liverpool in 1999, a Master Degree from Imperial College London in 2001, and a PhD in Physics from the University of Sheffield in 2004. Between 2004 – 2006, Dr. Sellers was a Marie Curie Fellow at CRHEA-CNRS in Valbonne, France, a position that was followed by a postdoctoral position at the University at Buffalo. In 2008, Dr. Sellers joined Sharp Laboratories of Europe in Oxford, UK where he also held the position of Visiting Academic Fellow in the Department of Materials at the University of Oxford. After spending three years in Industry, Dr. Sellers returned to the academic environment taking a position at the University of Oklahoma in 2011 where he is currently a Ted S. Webb Presidential Professor. In addition to his faculty position at OU, Dr.

Sellers is also the Associate Director of the Oklahoma Photovoltaics Research Institute.

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 rejoindre les rangs d'équipes de recherche et développement.

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

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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.



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