UGPN Research Collaboration Fund 2012-15

Introduction

Dear Colleagues,

The University Global partnership Network (UGPN) was launched in 2011 with a part of its mission to develop sustainable world-class research to benefit global society. The founding partners (North Carolina State University, University of Sao Paulo and the University of Surrey) have recently been joined by the University of Wollongong.

In order to foster the research culture across the partnership the UGPN created the research collaboration fund (RCF). This annual fund is available to support high quality bilateral and multilateral research projects. The fund has been instrumental in catalyzing researcher interactions across the UGPN and with 27 projects funded, including 9 trilateral projects, represents an investment of some $630K.

To celebrate the successes and challenges of the RCF we have produced this pamphlet that summaries each funded project highlighting outcomes and subsequent activities to secure follow-on funding. We hope that this provides a rich source of information on projects already supported by the UGPN and encourages new researcher networks to apply for funding in future calls.

Professor Vince Emery
Pro Vice-Chancellor (International Relations)
University of Surrey
Chair, UGPN Executive Group

Professor Mauricio Baptista
Associate Director of International Cooperation
University of São Paulo

Professor Bailian Li
Vice Provost International Affairs
North Carolina State University

Professor Joe Chicharo
Deputy Vice-Chancellor (Global Strategy)
University of Wollongong

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Bilateral projects

Creating Carbon Neutral Nations
(Trilateral research project 2012)

Overview
The project's aim was to create an ongoing interdisciplinary collaboration in key areas of bioenergy and bio-based products, engaging multiple generations of researchers and students interested in the transition to low carbon economies.

Outcomes
- Workshop at USP, 18-21 March 2013. Fieldtrips on forestry, paper & ethanol products
- C2N2 Brochure created April 2013.
- Richard Venditti visited Surrey in April 2013, discussing Life Cycle methodologies.
- Several bilateral activities: guest lectures, student exchanges.
- Research grant submitted to BBSRC (November 2013) – unsuccessful.

Future activity
A plan was written for a three-way joint seminar-based graduate course, led by Jonathan Chenoweth at Surrey, echoing a concept he was working on for a climate related course. Unfortunately there were regulatory barriers to implementing the concept.

Key contacts:
Richard Venditti, NC State
Hasan Jameel, NCSU
Jose Stape, NC State
Ronalds Gonzalez, NC State
Perry Peralta, NC State
Stephen Kelley, NC State
Matthew Leach, Surrey
Jhuma Sadhukhan, Surrey
Richard Murphy, Surrey
Francides Da Silva, USP
André Alcarde, USP

Genes and Behaviour
(Trilateral research project 2012)

Overview
The aim of the project was to bring together scientists with interests in different sub-disciplines related to genes and behaviour between the three members of the UGPN.

Outcomes
- Two workshops - one in Surrey December 2012, one in Raleigh May 2014.
- One 8-month research sabbatical (Malcolm von Schantz to USP, 2014)
- Three publications
- Three Professional Training Placements (student mobility)
- Two successful grant applications –

  - **Science without Borders/CNPq – £91,353**
    - Postdoctoral fellow & sandwich PhD student
    - Support grant
    - Three annual visits to USP
  - **Global Innovation Initiative (GII) - £149,780**
    - Triangulation Surrey-USP-University of Chicago
    - Postdoctoral fellow
    - Support grant & substantial travel funds

Future activity
The network created viable exchanges of academics and students as well as strong collaborative relationships. A considerable effort was channelled into producing grant applications. The GII project 'Sleep, circadian rhythms and cardiovascular health across ethnicities' is ongoing.

Key contacts:
Malcolm von Schantz, Surrey
Mario Pedrazzoli, USP
Alex Pereira, USP
Trudy Mackay, NC State
Robert Anholt, NC State

Interdisciplinary studies of Bio-Nano Interfaces
(Trilateral research project 2012)

Overview
This collaboration centred on interdisciplinary studies of bio-nano interfaces aimed at solving problems of global importance.

Outcomes
- A number of meetings held at NC State.
- Joint bid to the UK/US Global Innovation Fund – unsuccessful.
- Bid submitted through the BBSRC-FAPESP call in January 2015- unsuccessful.
- Close working relationship established between researchers at NC State and Surrey.

Future activity
The collaborative opportunity allowed staff to develop a wholly new avenue of research. Communication amongst staff continues. Re-submitting to BBRSC-FAPESP in 2016.

Key contacts:
Alex Smirnov, NC State
Alan Dalton, Surrey
David Bradley, Surrey
Antonio Costa-Filho, USP

Integration of smart materials
(Trilateral research project 2012)

Overview

Integration of smart materials with pattern recognition and nanofabrication techniques for the development of novel electrochemical disease diagnostics.

Outcomes

- Dr Paixão visited Surrey for five days
- Post-doc and postgrad student visited Surrey for 21days based in Dr Reddy's Lab
- Sub Reddy is senior author on paper published in Sensors and Actuators (co-authored by Thiago Paixão and Roger Narayan and teams)
- Sub Reddy is Editor of 'Advanced Synthetic Materials in Detection Science' (2014) with Chapter contributions from Reddy, Paixão and Narayan and teams
- Sub Reddy hosted Ligia Bueno (PhD student spent 6 months at Surrey; CAPES funded)
- Sub Reddy and Thiago Paixão received Royal Society Network Grant (£12k) funded Nov 2013 (UK & Brazil; 2 years)
- Applied for Global Innovation Initiative 2014 - unsuccessful
- Received Surrey/FAPESP funding 2014
- Sub Reddy and Thiago Paixão co-authored two papers in RSC Advances (2015)

Future activity

The team are applying for significant research funds to take their collaboration to the next stage.

Key contacts:

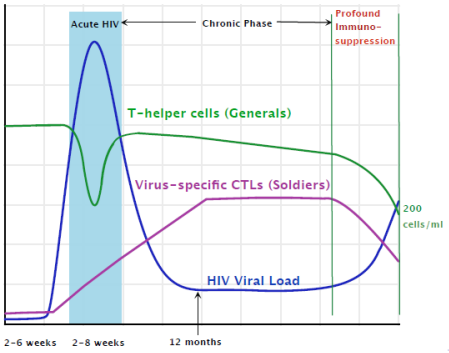
Sub Reddy, Surrey
Thiago Paixao, USP
Roger Narayan, NC State

Clinical Data Validated Mathematical Models of HCV Infection Dynamics
(Trilateral research project 2013)

Overview
An Interdisciplinary Approach for the Prevention, Treatment and Control of HCV Infection.

Outcomes
- Three papers submitted
- Three talks given at conferences in US, Brazil and Korea
- Mini symposium at SIAM Conference, US, 2014
- One report by graduate students
- PhD student from Surrey attended graduate training events at NCSU- awarded UGPN PhD mobility award

Future activity
The Team felt that future collaboration should not be focussed on HCV but should be in a different direction. The general consensus was that the UGPN meetings had been very useful as group meetings can also take place around them.

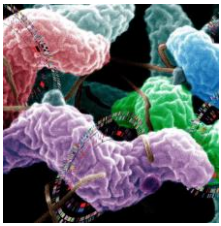


Key contacts:
Philip Aston, Surrey
Aluisio Segurado, USP
Hien Tran, NC State

Global public health surveillance
(Trilateral research project 2013)

Overview

This project sought to perform a pilot/demonstration laboratory monitoring/surveillance of antimicrobial resistance (AMR) project.



Outcomes

- One meeting held at Surrey
- Three bids submitted
  - BBSRC-USDA
  - AMR-NSF-UK
  - EPSRC
- One publication published 'Differences in carbon source utilisation distinguish *Campylobacter jejuni* from Campylobacter coli', BMC Microbiology, 2014
- One publication in preparation – AMR in Campylobacter in the UK, Brazil and the USA
- Seven new *Campylobacter* genomes submitted to the NCBI
- One PhD student at USP awarded additional FAPESP funding
- Scholar from NCSU visiting Surrey for three month funded Scholarship

Future activity

The project provided an excellent platform for continued collaboration between USP, NCSU and Surrey. The project team are collaborating together with regards to comparative studies of AMR in Brazil, UK and USA. A scholar from NCSU will be visiting Surrey in 2016.

Key contacts:

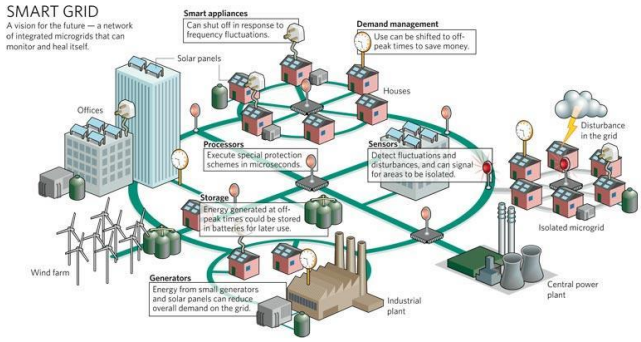
Roberto La Ragione, Surrey
Sid Thakur, NC State
Maria Correa, NC State
Andrea Micke Moreno, USP

On the Influence of Norms and Sanctions
(Trilateral research project 2013)

Overview
To develop research into the question of sanctioning in smart electricity grids, where autonomous agents and humans co-exist.

Outcomes
- Key findings were reported in an article 'Classifying Sanctions and Modelling a Sanctioning Process for Socio-Technical Systems', submitted to Knowledge Engineering Review Journal
- Two conference presentations
- A simulation model has been developed
- Application to GII - unsuccessful

Future activity
The partners continue to interact, although each of them are mainly conducting related research independently. It is expected that there related collaborative research proposals will be submitted in related areas. Tina Balke has left academia for a job in an IT consultancy where she is using knowledge gained during the project.



Key contacts:
Nigel Gilbert, Surrey
Jaime Sichman, USP
Munindar P. Singh, NC State

Developing a Collaborative Learning Network for Visitor Impact Monitoring in Protected Areas
(Bilateral research project 2012)

Overview
The overall goal of this project is to advance the science and practice of visitor impact monitoring in protected areas globally by developing a prototype Collaborative Learning Network of Visitor Impact Monitoring (CLN-VIM).

Outcomes
- Project Team Meeting in Piracicaba, São Paulo in December 2012
- GWS Panel – with the support of the George Wright Society (GWS) the project team was able to schedule a CLN-VIM panel session at the GWS Biennial Conference in Denver, Colorado, March 11-15, 2013
- IUFRO Workshop –the second workshop at the Protected Areas and Place Making Conference sponsored by the International Union of Forestry Research Organization (IUFRO)
- Website, web-portal and Linked-in group created

Future activity
The Team continue to work together.

Key contacts:
Yu-Fai Leung, NC State
Teresa Magro, USP

Synchronization of Time-Delay Coupled Networks
(Bilateral research project 2012)

Overview

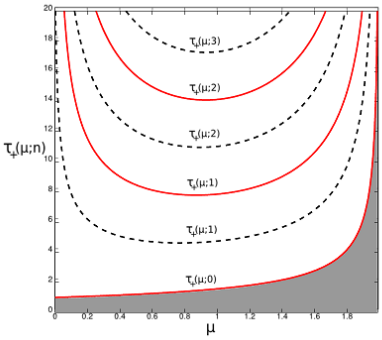
The objective of the project was to analyse the effects of time-delays in symmetric nonlinear networks, in particular how parameters of the system, such as the time delay, affect synchronization.

Outcomes

- Publication by Correa, Wulff and Piqueira 'Symmetric bifurcation analysis of synchronous states of time-delayed coupled Phase-Locked Loop oscillators' . Nonlinear Sciences and Numerical Simulation Volume 22, Issues 1–3, May 2015, Pages 793-820
- Visiting PhD student included the research done at Surrey into his PhD thesis and obtained his PhD in May, 2014.

Future activity

Collaboration may continue in the future. The team are studying in more detail the symmetries of the bifurcating solutions and hetero-clinic orbits.



Key contacts:
J.R.C Piqueira, USP
Claudia Wulff, Surrey

The Politics and Public Opinion of International Trade
(Bilateral research project 2012)

Overview
A comparative study of international trade involving staff at USP and NC State.

Outcomes
- Michael Cobb visited the University of São Paulo 2012.
- Experimental survey conducted.
- Paper presented at the American Political Science Association annual meeting, 2013.
- Mark Nance attended presentation by Brito Cruz, scientific director of FAPESP.
- Involvement in FAPESP week at NCSU (Nov. 11-12, 2013).
- Mini-conference at NC State including former ambassador's, US Department of Trade representatives, and the Assistant Secretary of Commerce for North Carolina.

Future activity
The team will collectively apply for the inaugural FAPESP-NC State research call, focusing on questions and processes of convergence in public and elite opinion regarding economic relations between US and Brazil.

Key contacts:
Mancio Jorge Oliveira, USP
Janina Onuki, USP
Michael Cobb, NC State
Mark Nance, NC State

TRANS: Transnationalism, Translation and Travel in Literary and Cultural Studies
(Bilateral research project 2012)

Overview
TRANS is a bi-lateral research project with the aim to establish and enhance international research in Arts and Humanities across two UGPN universities.

Outcomes
- A TRANS project website
- 1 book publication
- 2 bids to the AHRC
    - Mapping the Transfer of Walter Scott's novels to Brazil (AHRC)
    - Tropical Gothic (AHRC)

Future activity
Justin Edwards is planning a second co-authored book.

Key contacts:
Justin Edwards, Surrey
Lucy Bell, Surrey
Margaret Rogers, Surrey
Sandra Vasconcelos, USP
John Milton, USP
Laura Zuntini de Izarra, USP

Work schedules, light exposure and their effects on sleep, rhythms and wellbeing
(Bilateral research project 2012)

Overview
To investigate the influence of environmental and social factors on the biological rhythms, sleep and chronotype of workers in Chico Mendes Extractive Reserve (including rubber tappers and factory workers).

Outcomes
- Various meetings between Surrey and USP
- Postgraduate mobility including PhD student visiting Surrey Oct-Nov 2012
- International school 'Chronobiology and Working Life' as part of graduate programme in Public Health, São Paulo, 2014
- Presentations at a number of international conferences
- Successful application to seven funding bodies
    - CAPES/STINT
    - FAPESP/University of Surrey
    - FAPESP
    - CNPq
    - Funtac
    - Santander staff mobility

Future activity
Application submitted to Newton Fund for short term mobility. Communication amongst team ongoing.

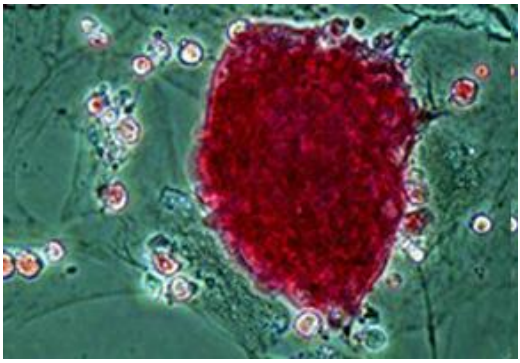
Key contacts:
Debra Skene, Surrey
Claudia Moreno, USP

Animal Induced Pluripotent Stem Cells Network
(Bilateral research project 2013)

Overview
This proposal was targeted at a collaboration between the laboratory of Dr. Piedrahita at NCSU and the laboratory of Dr. Ambrosio from USP. There were two Aims: 1) Generation of canine iPS cells and 2.) Development of TALEN technology.

Outcomes
- One paper submitted to the Journal Placenta
- One abstract presented at the Annual Meeting of the International Federation of Placenta Associations, Canada, 2013
- FAPESP website describing the project and results: http://agencia.fapesp.br/18298
- Matching funds from CCMTR/NCSU
- Student exchange

Future activity
The Team are hopeful that as the project matures they can expand into other areas so that this becomes a programmatic collaboration with multiple labs involved.



Key contacts:
Jorge Piedrahita, NC
Carlos Ambrosio, USP

Developing predictive mesoscale models for peptoids and their interactions
(Bilateral research project 2013)

Overview
Examination of the interaction between small molecules and proteins, as well as polyelectrolytes and proteins. These studies have allowed the Team to understand the influence of solvents and pH on the interactions of small/medium molecules with protein surfaces.

Outcomes
- Workshop on molecular interactions and nano-biological applications at USP
- Two papers submitted
- Establishment of an international network inc. European partners: STAMiNA, website: http://cthulhu.che.ncsu.edu/~erik/STAMiNA/STAMINA_Home.html
- Student mobility
- Bid for GII (Global Innovation Initiative) Programme.

Future activity
The Team submitted a grant proposal to the GII program to continue their collaborative work. If successful, the funds will be use to partially fund graduate students both in Brazil and in the US, as well as exchanging students between Brazil, US and the UK. The Team are currently also preparing a STINT proposal to continue the collaboration with our colleagues in Sweden, as part of the STAMiNA network.

Key contacts:
Erik E Santiso, NC State
Keith Gubbins, NC State
Fernando Barroso da Silva, USP

Harnessing fluid-structure interaction in wind power and sustainable air transport
(Bilateral research project 2013)

Overview
The aim of the project was to merge the areas of expertise of the investigators to tackle the multi-physics interaction between fluids and structures, focusing on the development of design-oriented modelling tools applicable to both wind energy and aerospace vehicles.

Outcomes
- One paper submitted to Journal of Fluids and Structures
- One conference paper published at AIAA SciTech Conference
- Work presented to aircraft manufacturers (Airbus and Embraer) by Dr Murua.

Future activity
Unfortunately, the team have been unable to identify suitable sources of external research funding that would support bilateral bids. However, collaboration continues. The work conducted by Dr Ramesh has been taken over by Mr James Johnstone, final year MEng student at Surrey.

Key contacts:
Joseba Murua, Surrey
Ashok Gopalarathnam NC State
Kiran Ramesh, NC State

Telling the truth to patients and families
(Bilateral research project 2013)

Overview
To capture the state of the art of knowledge about truth telling and communication of bad news in health settings from the perspective of healthcare professionals, patients and families.

Outcomes
- A systematics review of strategies used by health care professionals to communicate bad news to those with cancer
- A systematic review on the patient's experience of receiving bad news
- Paper submitted to the Journal of Palliative Medicine, January 2015
- Paper submitted to the Journal of Medical Ethics, April 2015
- Funding secured from Macmillan Cancer Support for 'Think Family Project' including collaborators in New Zealand and Brazil

Future activity
The 'Think Family Project' enabled colleagues to continue working together. Dr Arber will collaborate on a project looking at communication to women with breast cancer and their families in Brazil. Presentation of results at the International Family Nursing Conference and the RCN Nursing Research Conference

Key contacts:
Margareth Angelo, USP
Anne Arber, Surrey

Comparison of Air Pollution in Transportation Environments - CAPTEN
(Bilateral research project 2014)

Overview
The collaboration will tackle the exposure assessment of fine and ultrafine particulate matter, focusing on the development and testing of a practical-oriented journey-time exposure model for human exposure in diversified transport microenvironments.

Outcomes
- Two intensive field campaigns in Guildford and Raleigh
- PhD and Masters student mobility
- Prof Frey visited Surrey for one week, Dr Kumar visited NC State for one week
- Project workshop held at NC State June 2015, with speakers from US Environmental Protection Agency and the University of Hong Kong.
- Two publications drafted: 'A comprehensive evaluation of pollution exposure in transport urban microenvironments' Frey, C.H., Kumar, P., et al., 2016 and 'Comparison of PM exposure in UK and US cities' Kumar, P., Frey, C.H., et al., 2016
- Proposal submitted to HEAD-SET (Health Affects of Air Pollution in Delhi) December 2015

Future activity
The research ream plan to continue working together to complete the joint review paper and the research paper based on the findings from Raleigh and Guildford campaign for submission to quartile 1 journals. We are looking for opportunities for joint UK-USA calls for funding. We are also intending to apply for the next round of UGPN funding by expanding our network including partners from Hong Kong University and São Paulo.

Key contacts:
Prashant Kumar, Surrey
H. Christopher Frey, NC State

Emissions and Role of Fine Aerosol Particles in Formation of Clouds and Precipitation - eRAIN

(Bilateral research project 2014)

Overview

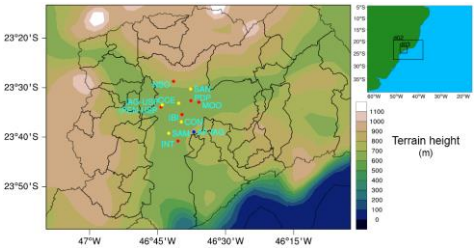
To develop a research framework by means of understanding the emissions of fine aerosol particles from vehicles and identifying their role in the formation of cloud condensation nuclei and precipitation by critical synthesis of the field data and numerical modelling studies.

Outcomes

- Two PhD students visited Surrey for 3 months
- Dr Kumar visited USP in April 2014 and January 2016
- Project workshop 18-24 January 2016 at USP
- Prof Andrade expected to visit in February and June 2016
- 1 publication in top ranked journal (Atmospheric Chemistry & Physics)
- Successful ESRC bid - ASTRID awarded 850k Euros
- UGPN RCF funding (4th round) for BIOBURN project
- Further bids in development including ASAP-DELHI and follow on from NUANCE project

Future activity

Already two further projects- ASTRID and BIOBURN have been drafted as follow-up projects to eRAIN, sustaining and broadening this partnership for some time to come.



Key contacts:

Prashant Kumar, Surrey

Maria de Fatima Andrade, USP

Modelling combustion noise spectrum for lean-burn engines
(Bilateral research project 2014)

Overview

To bridge a gap in understanding by bringing together experts in acoustic modelling and combustion numerical simulation. The resulting prediction model that captures the spectral characteristics will eventually help mitigate noise emission from realistic lean-burn engines at design stages.

Outcomes

- A theoretical model developed to predict the spectral characteristics of combustion noise
- PhD student involved in development of a new DNS code
- Conference proceeding at the 21st AIAA/CEAS Aero-coustics Conference, Dallas, Texas, 2015

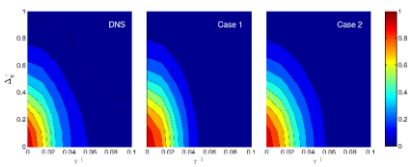
Future activity

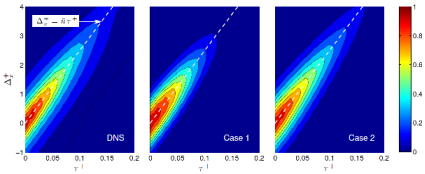
The new DNS code of a Bunsen flame within sufficiently long time is still under development. The plan is to complete this code and then collect data using several typical turbulence and thermochemical conditions. A new two-time correlation model will be constructed based on the data and be applied to the theoretical prediction model for combustion noise spectrum.

Key contacts:

Dr Yu Liu, Surrey

Prof. Tarek Echekki, NC State





Rule of Law
(Bilateral research project 2014)

Overview

This project explores the state of rule of law/access to justice in Brazil, using Argentina and Chile as counterpoints. More specifically, the focus of this project investigates the extent to which police, judges, attorneys, and civil society have institutionalized rule of law in Brazil's administration of justice.

Outcomes

- Workshop convened at USP (December 3-4, 2015) to explore the complex relationship between democratic institutions, civil society, political culture and public policy bringing together interdisciplinary perspectives of researchers from Brazil, Argentina, Chile and the United States
- Compilation of paper abstracts presented during the Workshop to form the basis of a book manuscript prospectus, which will be developed and submitted to possible publishers in the US
- A Portuguese version will be negotiated for publishing in Brazil

Future activity

Seminar participants will constitute an ongoing collaborative group that will seek funding for hosting a follow-on seminar based on one of several ideas that emerged from the Seminar. The team continues efforts on collaboration and post-workshop academic cooperation.

Key contacts:

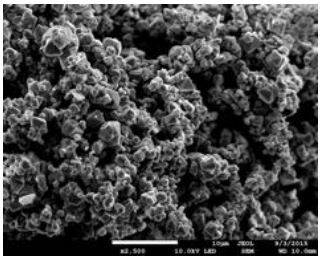
Clifford Griffin, NCSU
Traciel Reid, NC
Robert Moog, NCSU
Emmanuel Nunes de Oliveira, USP
José Álvaro Moisés, USP
Maria Tereza Sadek, USP

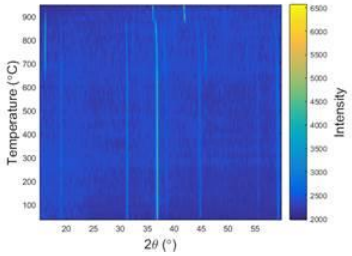
Structural Evolution of Ferroelectric Films
(Bilateral research project 2014)

Overview
The project was concerned with the study of the formation and stability of lead free functional materials during the synthesis and manufacturing stages.

Outcomes
- One abstract prepared for conference to be held in April 2016
- Paper drafted for submission to Q1 journal
- Material included in numerous presentations
- Staff mobility and PhD student mobility
- Surrey supported successful NCSU bid to form Research Triangle Nanotech Network (RTNN) - Prof Dorey main contact at Surrey

Future activity
With the ongoing drafting of papers and involvement in the RTNN, additional
routes for future collaboration will be explored. Future EPSRC-NSF type
funding opportunities will be actively pursued when they become
available as will informal sample exchange-type collaborations.





Key contacts:
Robert Dorey, Surrey
Elizabeth Dickey, NC State
Jacob Jones, NC State

Current research projects & future funding

UGPN RCF Projects 2015-16

Trilateral

- Towards the Treatment of Aerosol Emissions from Biomass Burning in Chemical Transport Models (BIOBURN)
- Understanding CaPP Deposition Disease (Pseudogout); Molecular Modeling & Simulation

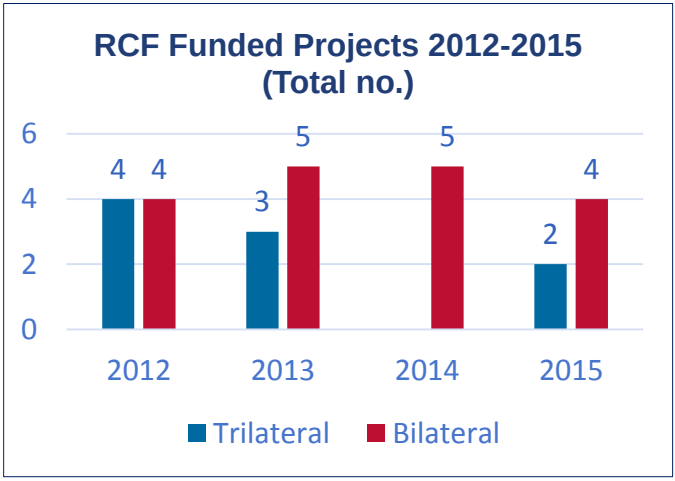
Bilateral

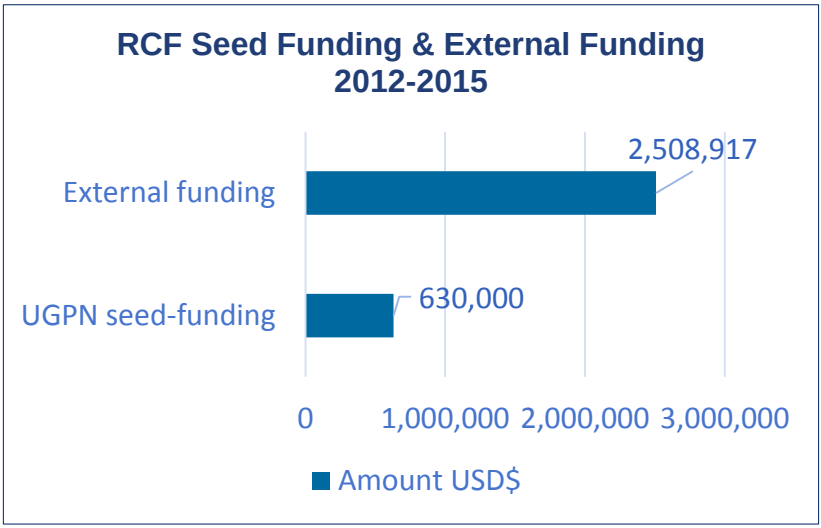
- Characterization of Organic Scintillator Response to Fast Neutrons for Detection and Identification of Special Nuclear Material, *(NC State & Surrey)*
- Green Composites from Tururi Fiber and Soy-Based Resin, *(NC State & USP)*
- Green Infrastructure Research Development for Stormwater and Air Quality, *(NC State & Surrey)*
- White-brown fat plasticity and metabolic inflammation in obesity and diabetes, *(NC State & USP)*

Future funding

Calls for applications for the fifth round of the Research Collaboration Fund will be opened in March, with a submission deadline in May 2016. For further information please visit the UGPN website (www.ugpn.org) or contact Ms Louise Lawton, UGPN Secretary: louise.lawton@surrey.ac.uk

Summary of projects and leveraged grants





February 2016


UGPN
University Global Partnership Network