The Charles Perkins Centre: a new model for tackling chronic disease

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Like all animals, humans have evolved to minimize energy expenditure and maximize accessibility to safe and palatable food

We have built a world that meets our ancestral 'heart's desire' … and is killing us

- Food production and supply systems maximize the qualities missing in our ancestral environments.
- Cities, homes and workplaces designed to allow minimal energy expenditure.
- Economic systems are designed to value wealth over health.
- Companies that sell us what we want prosper; even if that means selling us foods that degrade health.
- Prevention is better than cure, yet makes little profit or garners votes in the short term.

Why is a University well placed to offer solutions?

- Endless source of clever young people at their peak of creativity
- Huge multidisciplinary potential – a one-stop-shop
- But need to break down disciplinary silos to gain depth and breadth

What was CPC asked to deliver for the University?

- Bring University together across its disciplines and locations and collocate critical research mass to address this major societal problem
- Build new collaborative, multi-disciplinary research and education with impact
- Design, build and populate the CPC Research and Education Hub

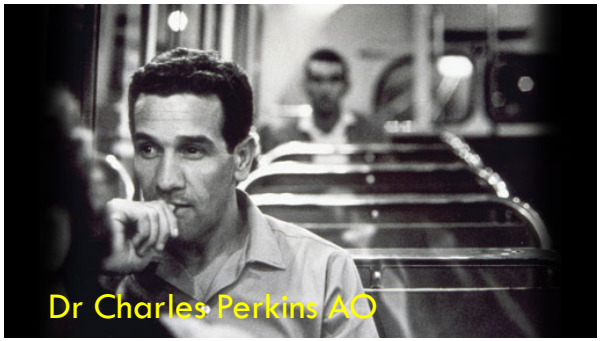
And for society - our mission:

To ease the burden of obesity, diabetes, cardiovascular disease and related conditions by generating collaborative research and education that translates into real-world solutions

"…health of the nation and its children is inextricably linked to a complex web of influences..."

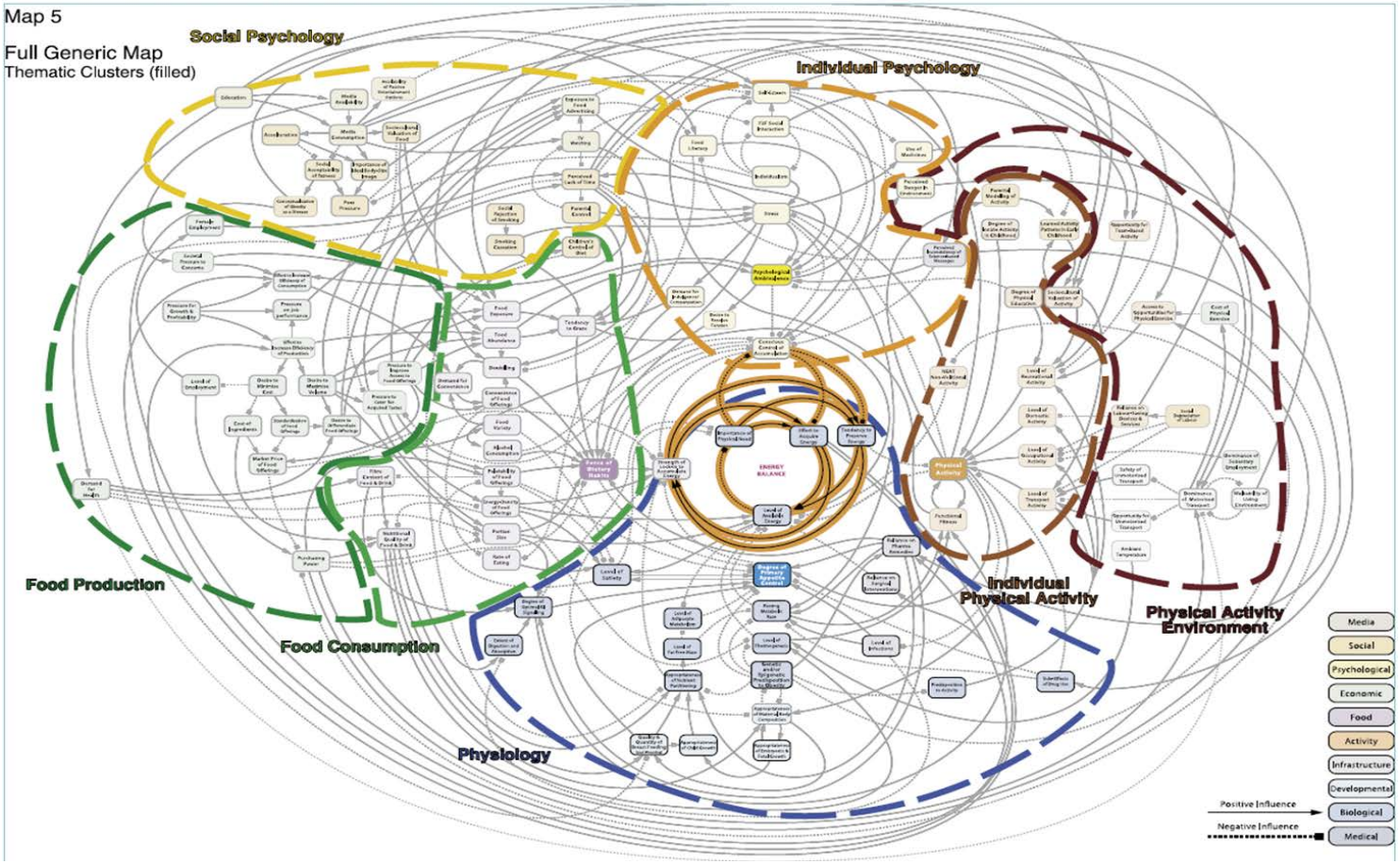
(National Academy of Science, Accelerating Progress in Obesity Prevention: Solving the Weight of the Nation).

Taking a complex systems approach is the key to success

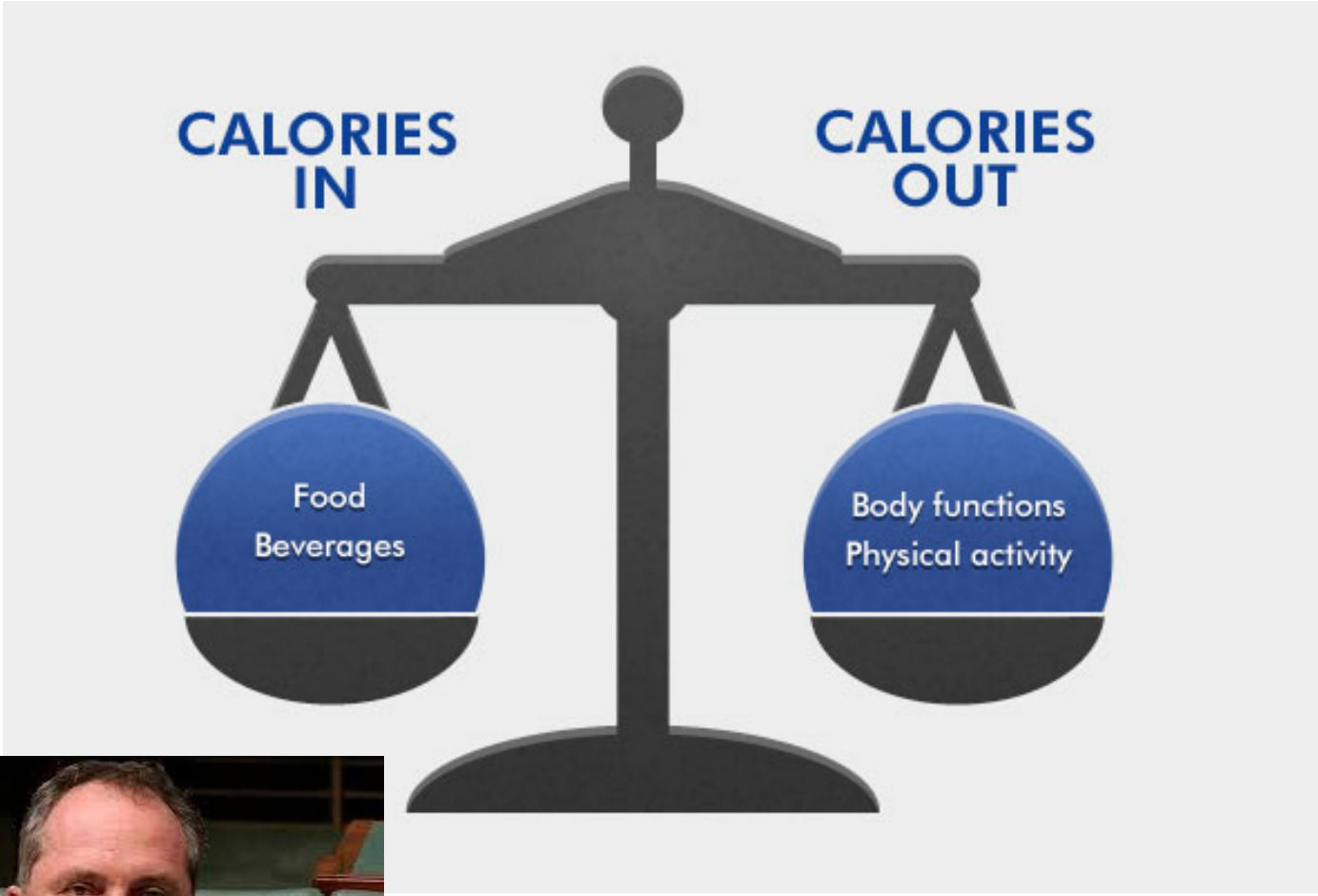


Complex problems requiring new approaches

Figure 5.2: The full obesity system map with thematic clusters (see main text 5.1.2 for discussion)[17,18] Variables are represented by boxes, positive causal relationships are represented by solid arrows and negative relationships by dotted lines. The central engine is highlighted in orange at the centre of the map.



The too simplistic

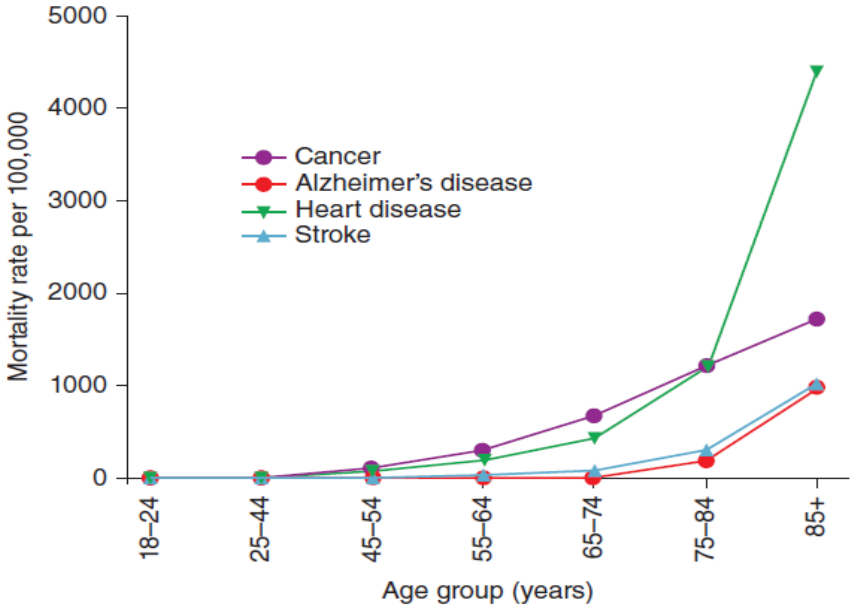


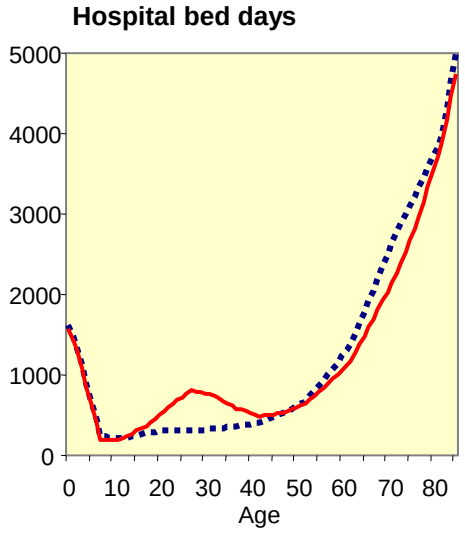
"People are sitting on their backside too much, and eating too much food ...
So get yourself a robust chair and a heavy table and halfway through the meal, put both hands on the table and just push back. That will help you lose weight."

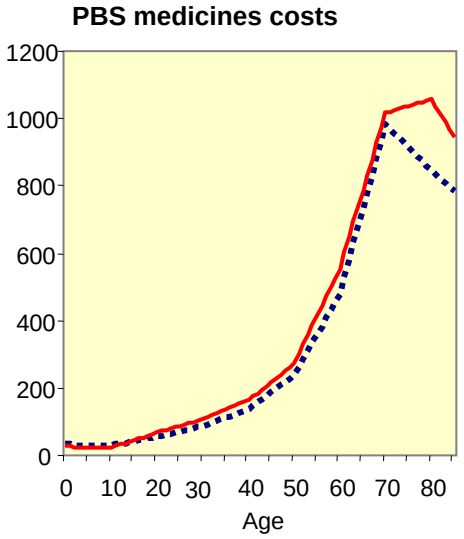
But admitting complexity is not enough – need to tame it

- Model suites of interventions that have greatest impact within complex systems
- Look for common causes rather than take a disease-centric view

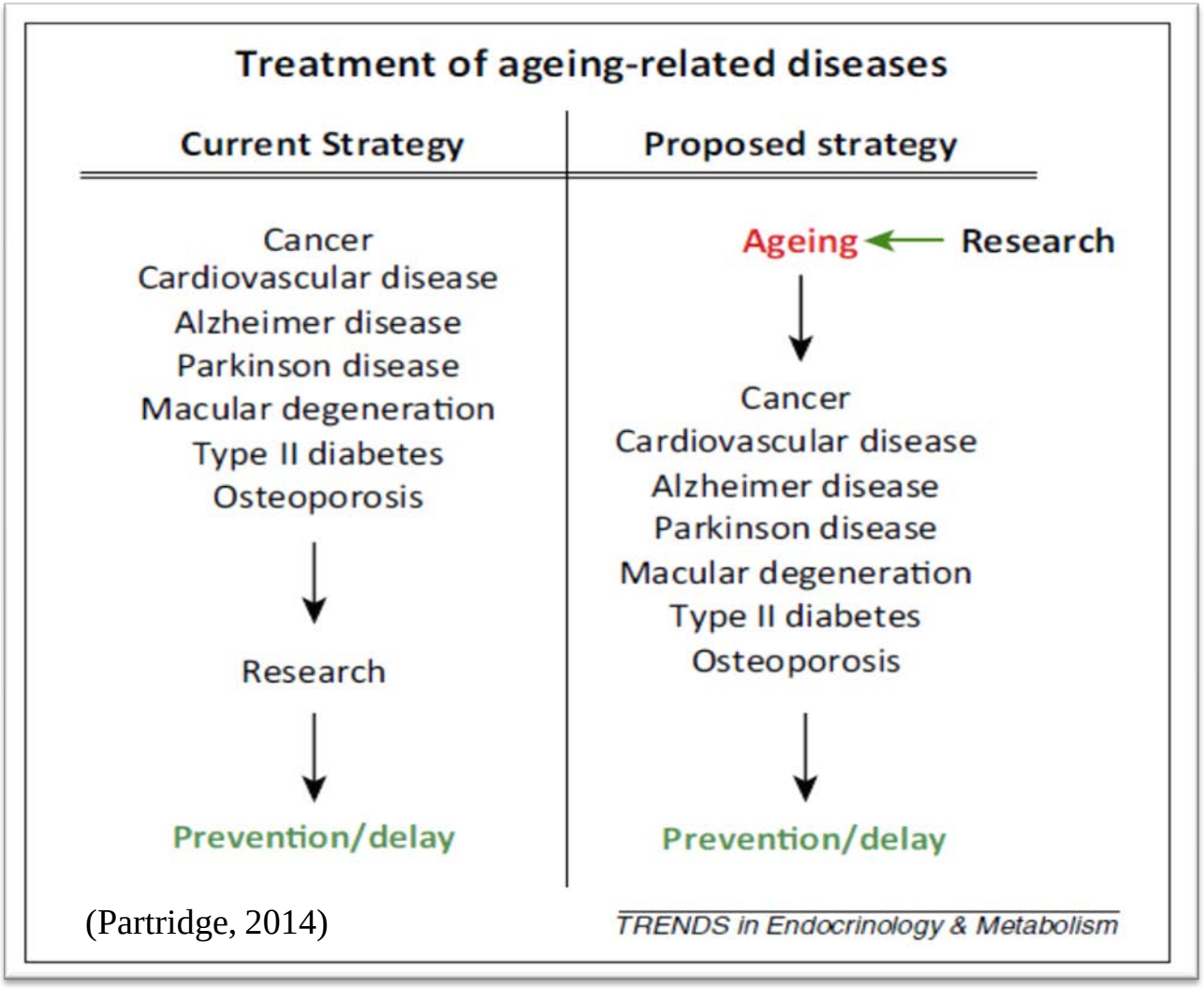
Ageing as an example:







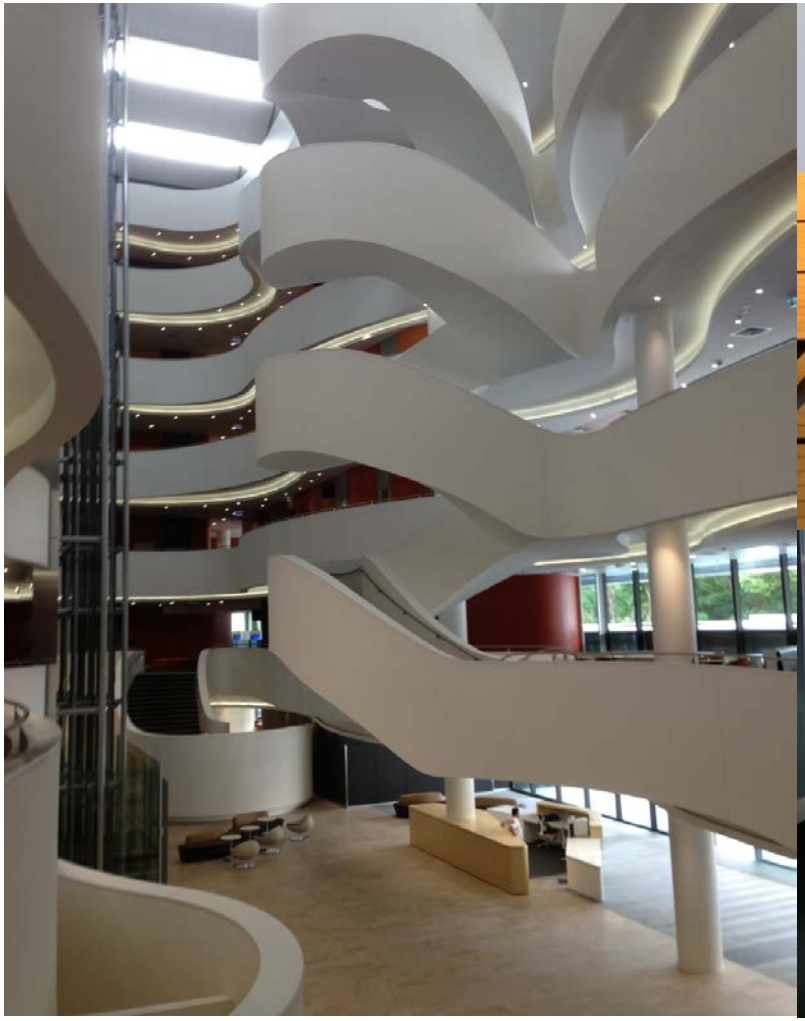
Understanding the biology and determinants of ageing offers the potential to delay geriatric outcomes and improve health in late and middle age



Research and Education Hub

- $385 million building
- 50,000 m^2 of wet lab, dry lab, teaching, core facilities, Ainsworth Interactive Collection of Medical Pathology, and the CPC RPAH Clinic
- >850 researchers spanning many disciplines

Research and Education Hub



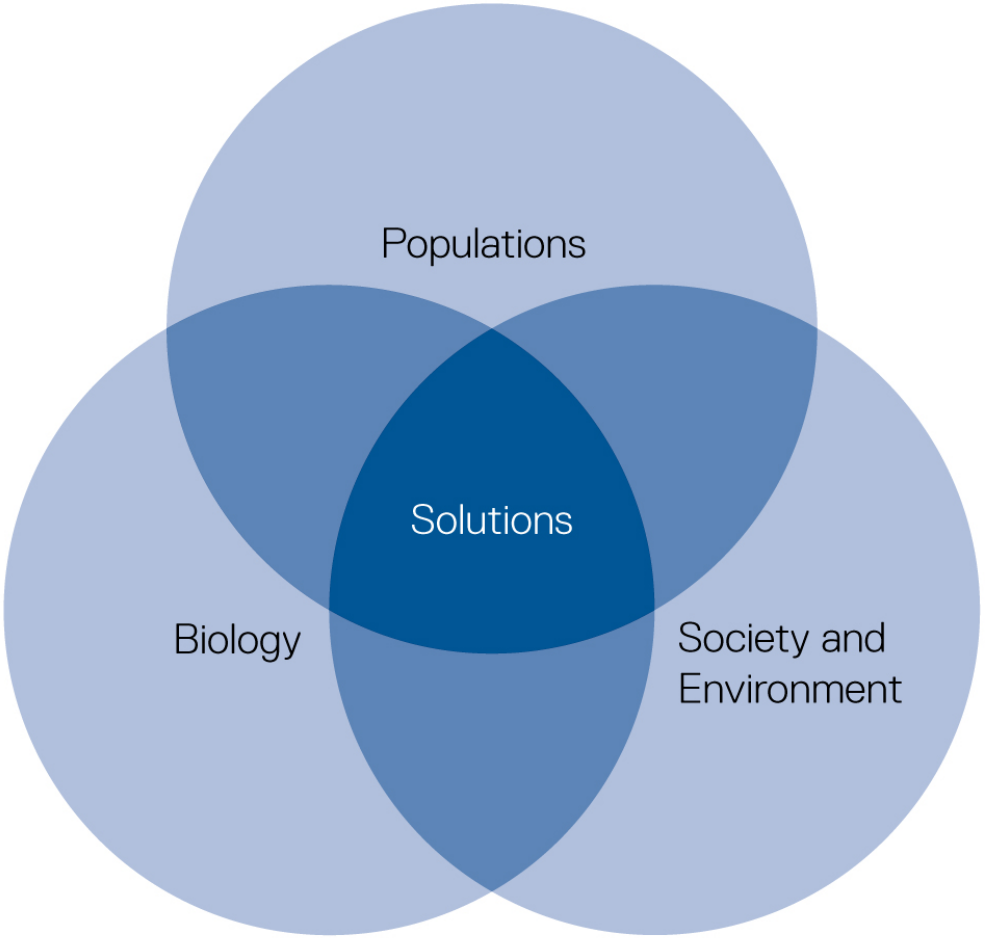
Our other Hubs:
Charles Perkins Centre Broken Hill

Charles Perkins Centre Nepean

Charles Perkins Centre Westmead

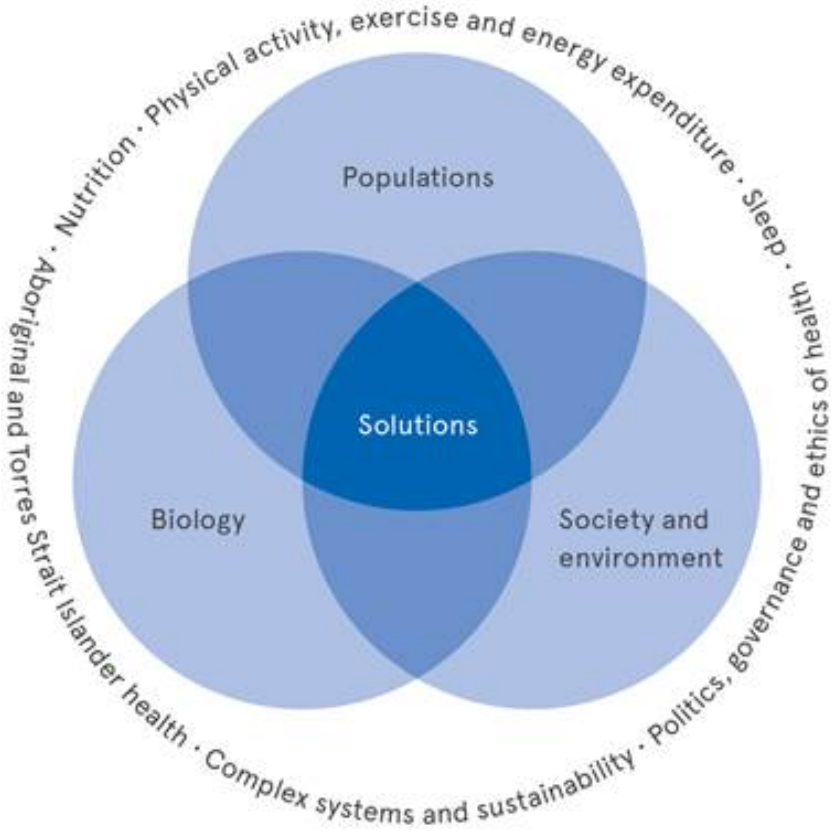
Research Strategy: DOMAINS

Our research comprises four interlinked domains (broad discipline areas)



Research Strategy: THEMES

Several themes run as threads throughout all four domains, and offer a means of tying together the entire research network:

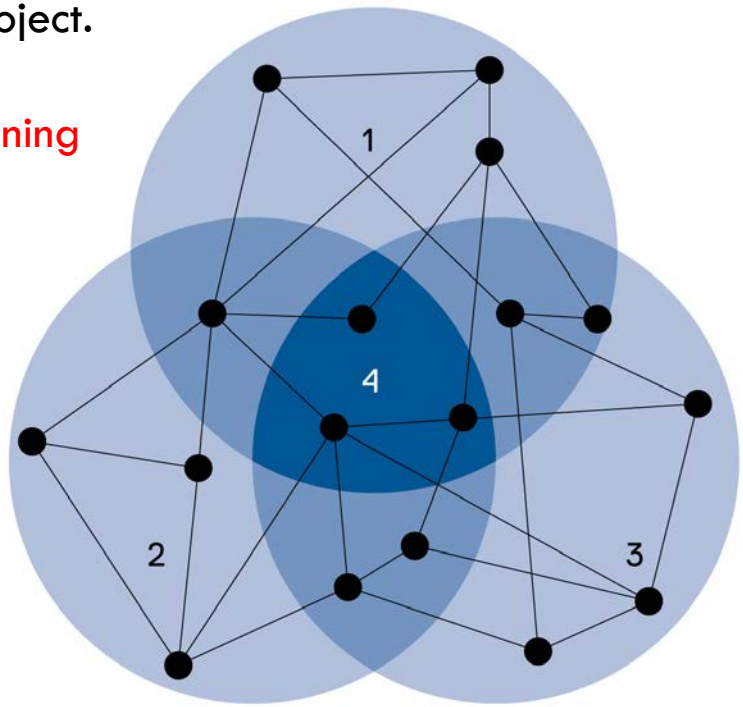


- Nutrition
- Physical activity, exercise and energy expenditure
- Sleep
- Aboriginal and Torres Islander health
- Ethics, politics and governance of chronic disease
- Complex systems and modelling

Research Strategy: PROJECT NODES

Our research domains are addressed by a dynamic network of richly linked project nodes established around a specific multidisciplinary research project.

Membership of CPC accompanies initiating/joining nodes.



Research domains:

1. Populations
2. Biology
3. Society and Environment
4. Solutions

67 active Project Nodes established since June 2012, including:

- Aboriginal Nutrition, Physical Activity and Wellbeing
- BABY1000 – preconception, pregnancy and childhood cohort study
- Building system wide capacity for complex and big data analysis and storage in T2D
- Broken Hill – an integrated community-led, community-level intervention study
- Businesses, Markets and the Social Context of Health
- Cardiac Translational Imaging
- Chronic Disease Management Clinical Project Node
- Community Academic Partnerships (CAP) in Health, Wellbeing, and Health Workforce development
- E-health in Gaming and Avatars
- Developmental Origin of Health and Disease (DOHaD)
- Gut Microbiome
- Health and Economics: cross portfolio impacts of health on individuals and families
- Health Literacy Chronic Disease Network
- Human-Animal Interactions
- Lifestyle Management Clinical Project Node
- Paddock to Plate: optimising food production and delivery with a focus on nutrition
- Politics of Obesity
- Population Analysis of Human Diet and Nutrition
- Translational Gerontology
- Women's Health Clinical Project Node
- Wireless Wellbeing and Personalised Health
- Writer in residence – and commissioned playwright too

Attracted new and existing stars – established and early career


Prof David James


Prof Paul Griffiths


Prof Stephen Colagiuri


Prof Adrian Bauman


Prof David Raubenheimer


Prof Zdenka Kuncic


Prof Peter Cistulli


Prof Sharon Naismith


Prof Philip de Chazal


Prof Lisa Bero


Prof Robyn Gallagher


Prof Manos Stamatakis


Prof Joerg Eberhard


Prof Shaun Jackson


Prof Philip Hogg


Prof Peter Thorn


Dr Melkam Kebede

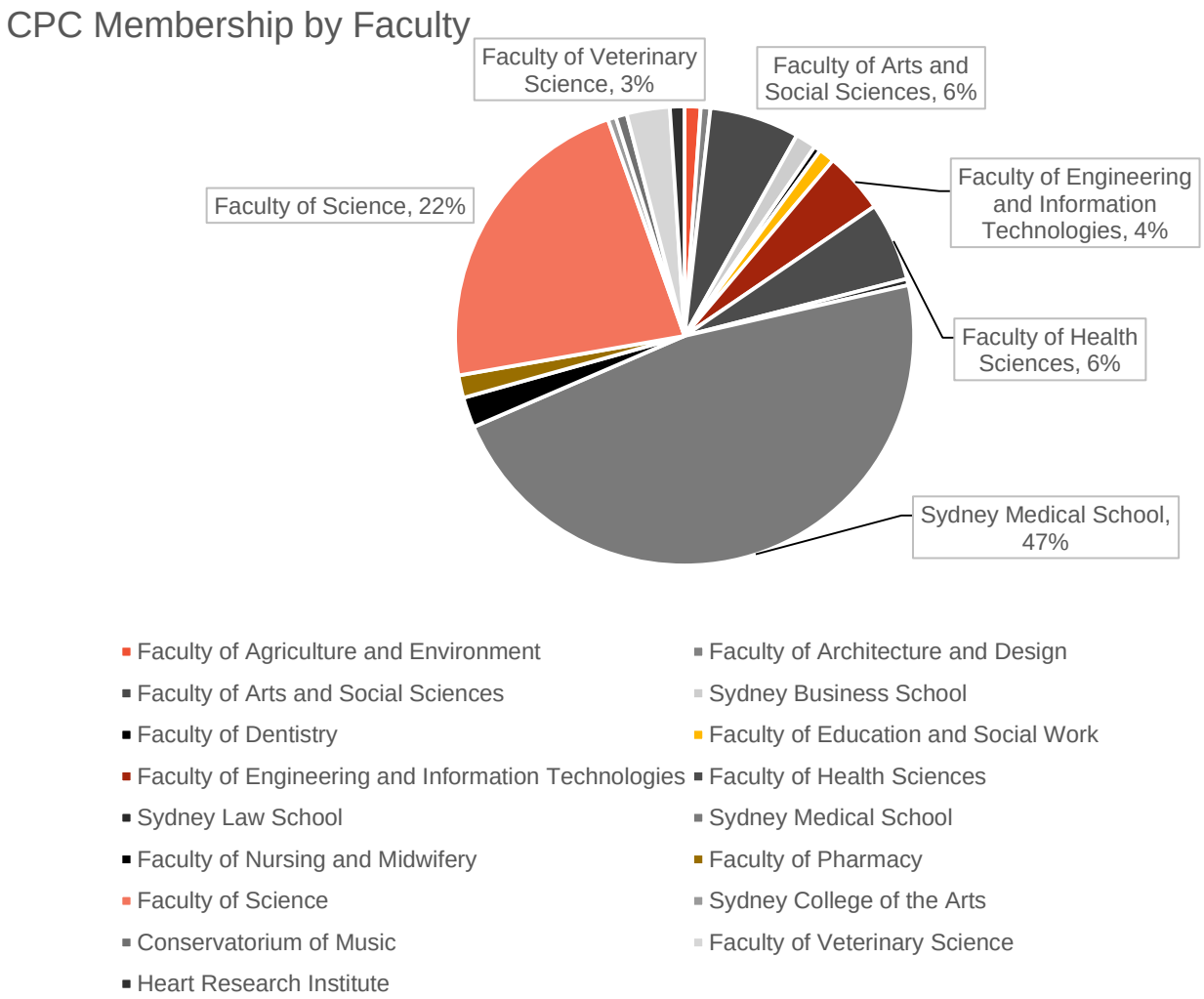

Dr Samantha Solon-Biet


Dr Laurence Macia

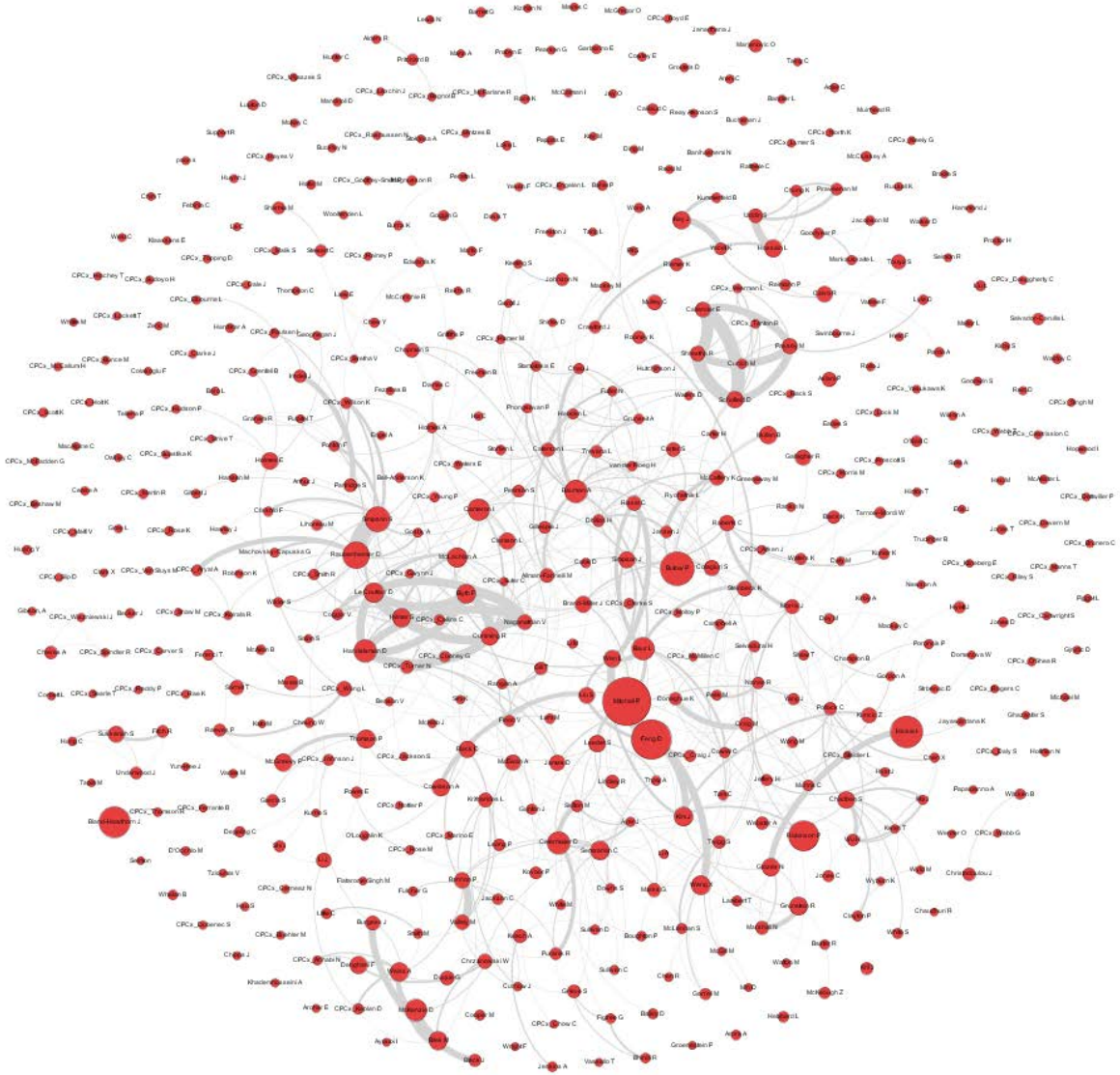

Dr Alistair Senior


A/Prof Greg Neely

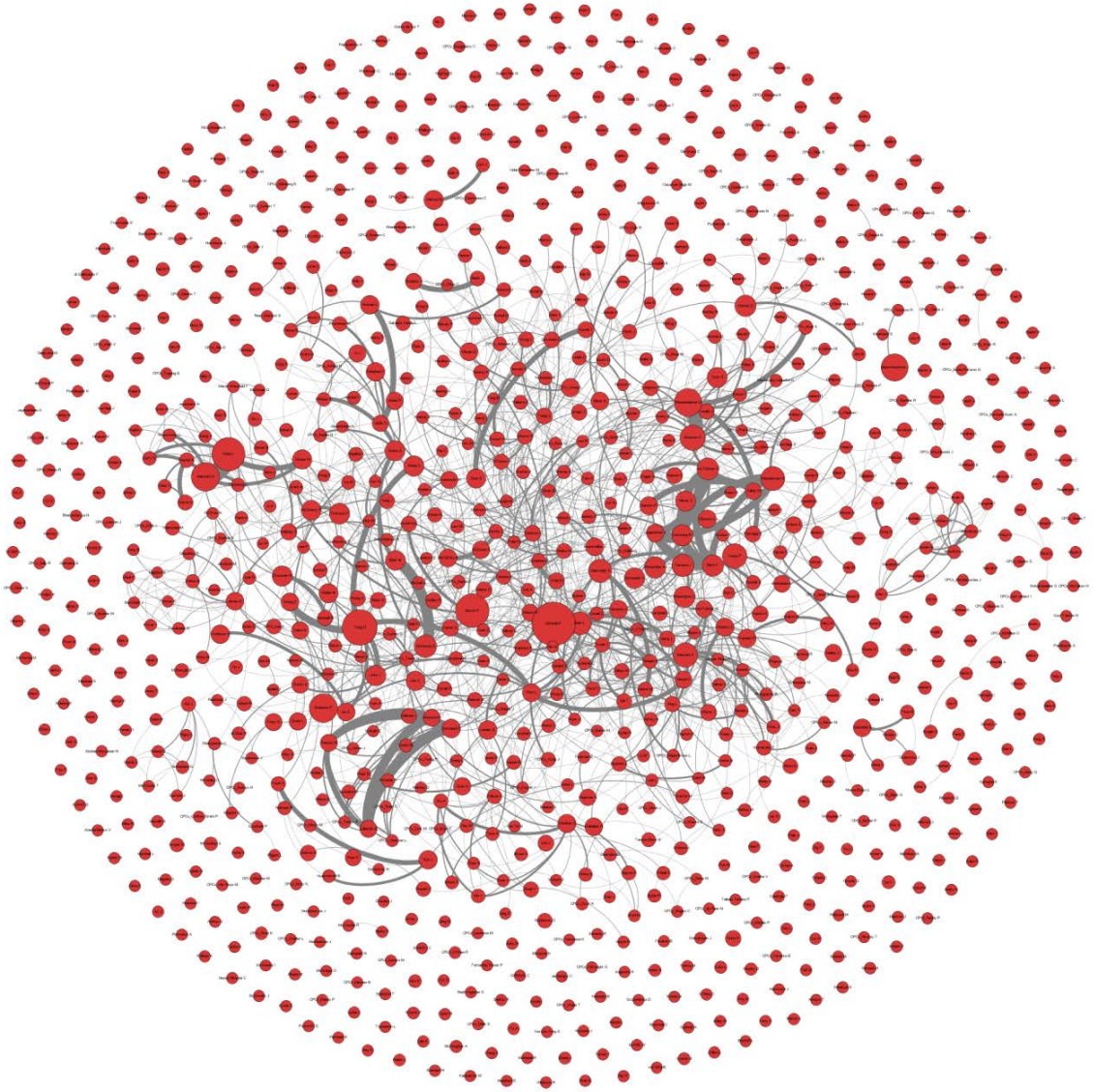
Engaging all 16 (as was) Faculties



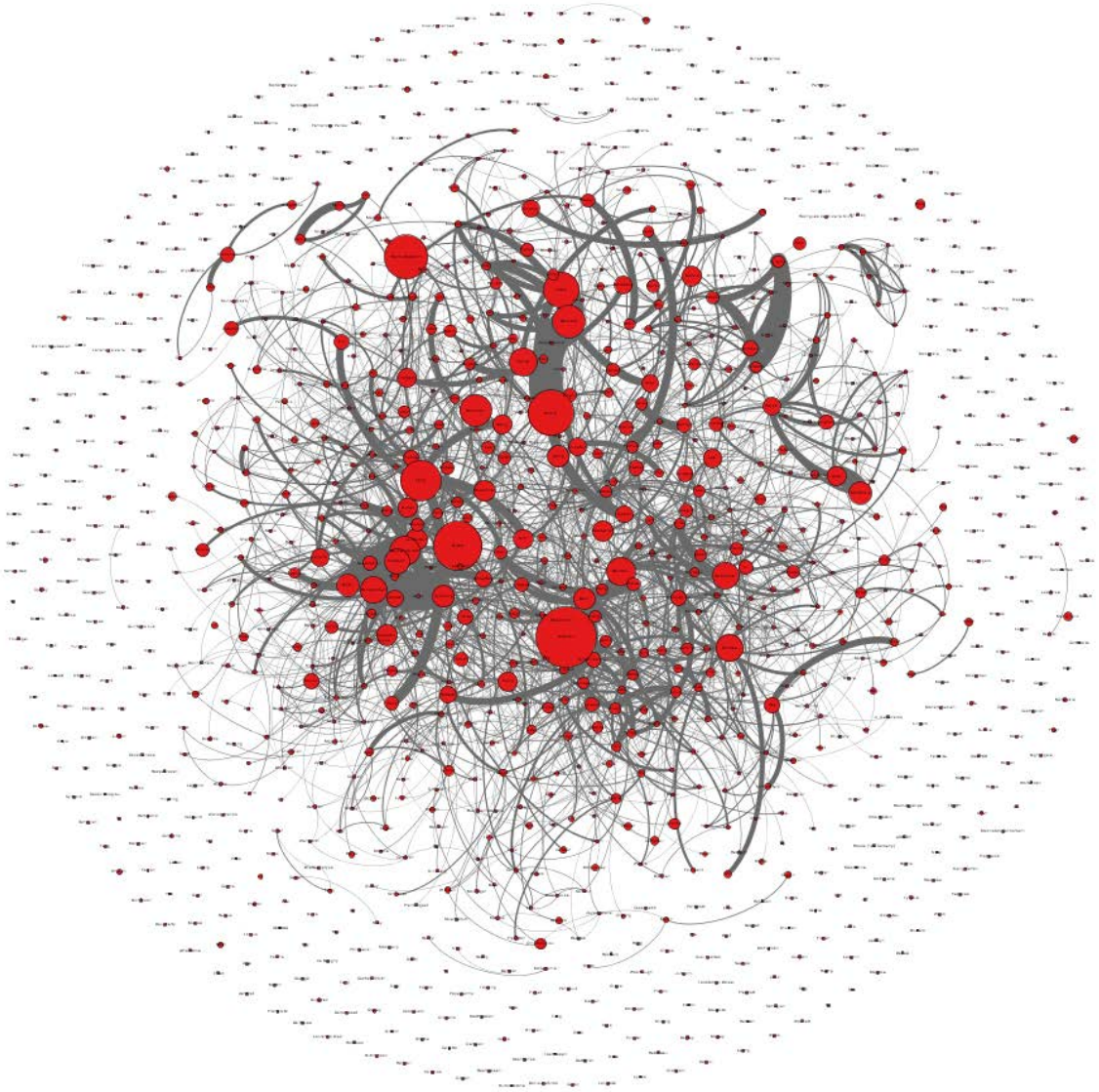
The collaborative network of new members - 2014

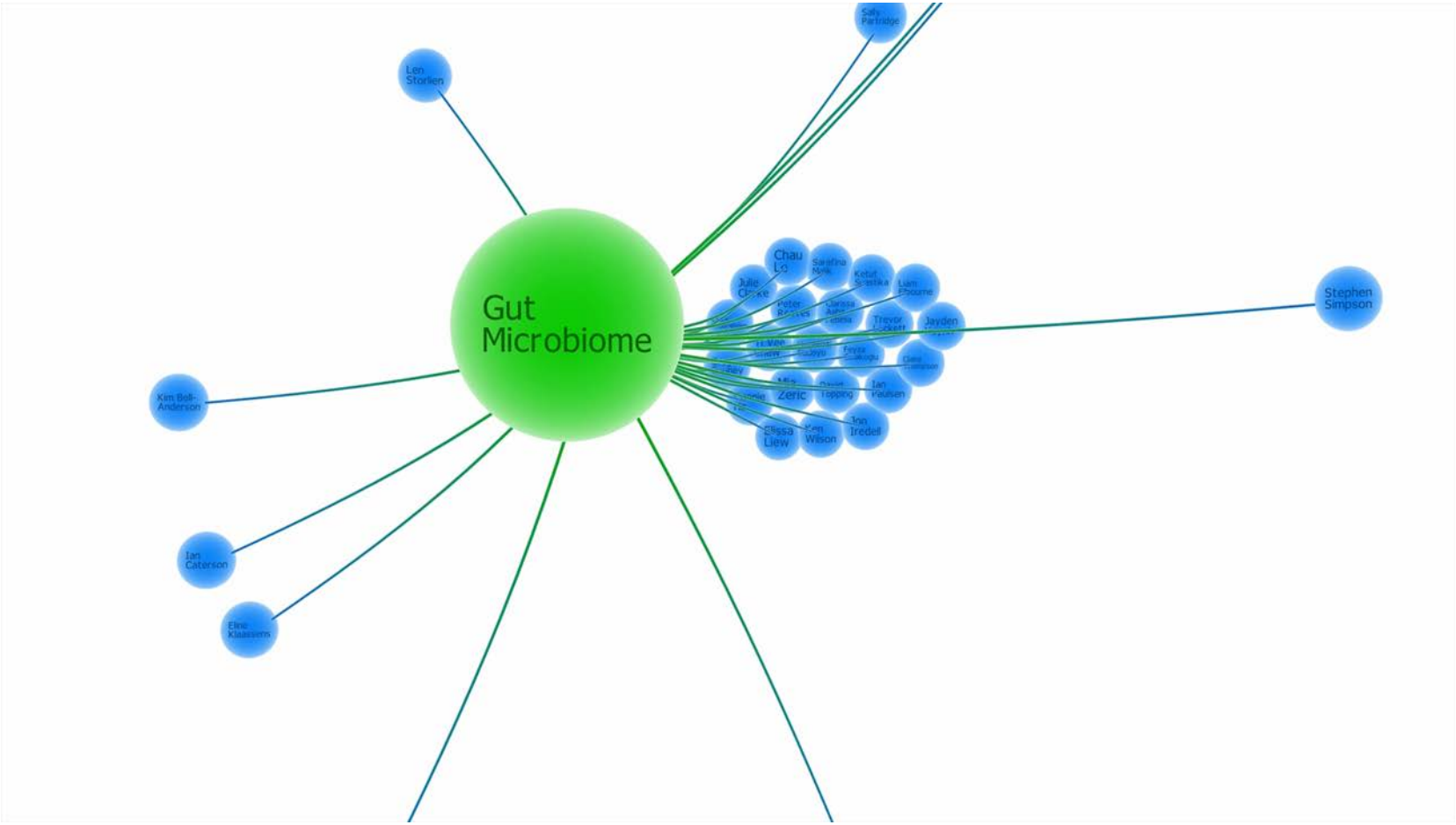


The collaborative network of new members - 2015



The collaborative network of members - 2016




Gut
Microbiome
Len
Storlien
Kim Bell-
Anderson
Ian
Caterson
Stephen
Simpson
Chau
Lo
Zeric
Ian
Iredell

It all comes back to the power of complex, adaptive systems

Set up the model correctly and you get order and impact for "free"

- Make it attractive and easy for individual researchers to engage

  …. and make it worthwhile for their Faculties to let them;
- Set the rules of engagement – ambition, collaboration, sharing, partnership;
- Make it easy to find compatible expertise, thereby keeping disciplinary depth and gaining breadth;
- Set a single overarching mission but don't prefigure routes to that end, constrain what is done based on presumptions of what is relevant, or insist on everything being directly translatable (useful);
- Nodes will yield new knowledge but also inevitably interconnect to yield larger outcomes;
- Capture and communicate these for public good;
- Foster entrepreneurship and commercialisation.