The European Union's Research And Innovation Programs

How is HORIZON 2020 progressing?

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Seminar plan

- What is Horizon 2020
- Where does Australia fit?
- The opportunities
- Planning head – future calls, Brexit
- Q&A – let's get specific about *your* needs

What is it?

- Largest research & innovation funding program *in the world*
- A program of the European Commission, an instrument of policy to:
  - Find answers to specific policy items
  - Stimulate innovation (and hence economic growth & jobs)
  - Enhance European integration & collaboration
- €80 billion, 2014-2020
- *ec.europa.eu/programmes/horizon2020*

Yes, but what *is* it?

- Funding for all areas of research (not only science / technology)
- “Discovery” projects (similar to ARC Discovery), scholarships and fellowships
- Networking and policy platforms
- Examining / solving industrial, environmental and social problems
- Building capacities and infrastructures
- Supporting SMEs

Australia in H2020?

- First, understand that…
  - this is a *European* program
  - financed by *European taxpayers*
  - for the benefit of *Europe*
- Second, these Europeans love crowds
  - Projects must (usually) involve *at least* three partners from different "European" countries
  - Beyond that, *anyone* else can also partner

Including Australia

- Australia is called a “third country” and a “high-income” country, meaning:
  - We are an “add on” to most project proposals
  - We don’t automatically get € funding
  - We shouldn’t be the project lead (coordinator)
- Hints:
  - Sell your sizzle (articulate your value)
  - Clarity about how your work will be funded (and backup plans)

Funding is always tricky

- Health
  - NHMRC - European Union Collaborative Research Grants
    www.nhmrc.gov.au/grants-funding/apply-funding/nhmrc-european-union-collaborative-research-grants-funding-commencing-0
- Everything else?
  - Global Connections Fund
    for international research-SME collaboration
    globalconnectionsfund.org.au
  - Global Innovation Linkages
    for international linkages around the Industry Growth Centres
    business.gov.au/GIL

Getting €

- Getting € funding is possible, but you need to:
  - Demonstrate a valuable and unique contribution to the project
  - Be essential in order to address the call requirements (i.e. your contribution couldn't easily be conducted be a European)
  - Broader tacit benefits of your involvement (e.g. Asia-Pacific networks, business linkages, etc.)
  - Have the project *coordinator* championing you
  - Be lucky

Some great Aussie examples

- MESOPP – Mesopelagic Southern Ocean Prey and Predators
  UTas, CSIRO, AAD
- BRIDGES – Breast Cancer Risk after Diagnostic Gene Sequencing
  QIMR, UniMelb
- THOR – Technical and Human Infrastructure for Open Research
  Monash University
- STORIES – Students Visions on the Future of Space Exploration
  Curtin University
- … 30 running projects at present, funding up to €2.4million for Aus partner, nearly half are in medicine, *cordis.europa.eu/projects*

How is H2020 packaged?

Excellent Science	Industrial Leadership	Societal Challenges
European Research Council (ERC)	Nanotechnologies, Advanced Materials, Advanced Manufacturing and Processing, and Biotechnology	Health, Demographic Change and Wellbeing
Future and Emerging Technologies (FET)		Food Security, Sustainable Agriculture and Forestry, Marine, Maritime and Inland Water Research and the Bioeconomy
Marie Skłodowska-Curie actions (MSCA)	Information and Communication Technologies (ICT)	Secure, Clean and Efficient Energy
Research Infrastructures, including e-Infrastructures		Smart, Green and Integrated Transport
	Space	Climate Action, Environment, Resource Efficiency and Raw Materials
	Access to risk finance	Europe in a changing world - Inclusive, innovative and reflective societies
	Innovation in SMEs	Secure societies – Protecting freedom and security of Europe and its citizens

European Research Council

- *erc.europa.eu*
- Investigator driven grants for the best researchers (Excellence)
- Highly prestigious, highly competitive
- Any research topic, any field
- Any researcher of any nationality can apply
- Portable grant

- Must undertake the project at a host institution in MS/AC (including private enterprise)
- Can include international partners (with funding)
- Must spend at least 50% (30% for AdG) of time working on project, and 50% of time in MS/AC – i.e. joint appointments are possible
- Funding for up to 5 years
- Starting Grant (StG)
  2-7 years after PhD, €1.5 million + €0.5 million
- Consolidator Grant (CoG)
  7-12 years after PhD, €2 million + €0.75 million
- Advanced Grant (AdG)
  €2.5 million + €1 million

Marie Skłodowska-Curie Actions

Most useful MSCA mechanisms:

- Individual Fellowships (IF)
- Research and Innovation Staff Exchanges (RISE)
- Innovative Training Networks (ITN)

Evaluation: excellent (50%), impact (30%), implementation (20%)

ec.europa.eu/research/mariecurieactions

MSCA IF

- For individual researchers to experience:
  - International mobility, or
  - Intersectoral mobility
- Two types of fellowships:
  - European Fellowship (to MS/AC)
  - Global Fellowship (to external country)

- 1-2 years (+1 year return to MS/AC for Global Fellows)
- €55,800/y salary, plus mobility & family allowances
- Must have PhD, or 4+ years equivalent experience

MSCA RISE

- For lab-lab exchange activities
- Knowledge-sharing via:
  - International mobility, and/or
  - Intersectoral mobility
- Early-career or experienced researchers, or administrative/technical staff
- Minimum 2 MS/AC partners, plus 1 other (normal funding rules apply)
- 1-12 months (total) per exchange

MSCA ITN

- Research / doctoral training programmes
- Three types of programmes:
  - European Training Networks (ETN)
  - European Industrial Doctorates (EID)
  - European Joint Doctorates (EJD)
- Minimum 3 MS/AC partners (normal funding rules apply)
- 3-36 months per researcher

Future and Emerging Technologies (FET)

- "Visionary thinking can open up promising avenues towards powerful new technologies"
  - i.e. high risk / high reward
- FET Open
  - Ambitious breakthrough goal, novel, high-risk, long-term vision, interdisciplinary
- FET Flagships
  - Graphene Project
  - Human Brain Project

Some upcoming call topics

ec.europa.eu/research/participants/portal/desktop/en/opportunities/h2020

- ICT
  - Platform technologies for IoT
  - Challenges of real world use of big data
  - Adapting automation technology abilities to market needs
  - ICT infrastructure for road transport automation
  - Technologies for Petabit networks, photonic integrated circuits, and optical manufacturing
  - Collective awareness platforms for sustainability and social innovation
  - Tools for the creative industries
  - Accessibility and useability of software and devices

- Manufacturing
  - Advanced surface manufacturing processes for mass production
  - Integration of unconventional technologies for multi-material processing into manufacturing systems
  - Design and predictive maintenance technologies for increased operating life of production systems
  - New technologies and life cycle management for reconfigurable and reusable customised products
  - Process optimisation for raw material resources
  - CO_2 utilisation to produce added value chemicals
  - New electrochemical solutions for industrial processing, to reduce CO_2 emissions
  - Standardisation needs and ways to overcome regulatory bottlenecks in the process industry

- GNSS, Earth observation and satellite technologies
  - High speed data transmission
  - Scientific data exploitation
  - Space weather
  - Downstream applications of Copernicus (EU's Earth observation and monitoring programme)
  - Transport applications, in all transport modalities
  - Mass market applications, particularly in smart cities, internet of things, and location-based services
  - Applications in agriculture, surveying and mapping, and timing and synchronisation
  - Novel in-situ observation systems

- Medicine & health
  - Diagnostic characterisation of rare diseases
  - Personalised coaching for well-being and care of people as they age
  - In-silico trials for developing and assessing biomedical products
  - Personalised computer models and in-silico systems for well-being
  - Micro-nano–bio systems for in vitro/in vivo diagnostics and for therapy monitoring
  - Development of a nanomedicine ecosystem
  - Tackling the childhood obesity epidemic
  - Health, obesity and safety aspects of sweeteners and sweetness enhancers

- Agriculture & aquaculture
  - Adaptive tree breeding strategies and tools for forest production systems
  - Robotics for precision farming
  - Contentious inputs in organic farming
  - Emerging diseases in plants and terrestrial livestock
  - Validation of diagnostic tools for animal and plant health
  - Bee health and sustainable pollination
  - Innovations in plant protection
  - Smart fisheries technologies
  - Permanent grassland farming systems and policies
  - Functional biodiversity
  - Closing loops at farm and regional levels
  - Innovative solutions for sustainable food packaging
  - Innovative solutions for improving properties of seafood

- Energy
  - Waste heat recovery from urban facilities and re-use
  - New energy knowledge and technologies
  - Reducing the cost of PV electricity
  - Reducing the water consumption of CSP plants
  - Use of solar heat in industrial processes
  - Easier to install and more efficient geothermal systems for retrofitting buildings
  - Measuring, monitoring and controlling the risks of CCS, enhanced geothermal systems, and unconventional hydrocarbons in the subsurface
  - CCS in industry, including Bio-CCS
  - Geological CO_2 storage pilots

- Transport
  - Resilience to extreme (natural and man-made) events
  - Big data in transport
  - Improving accessibility, inclusive mobility and equity
  - Reducing aviation noise
  - Protection of all road users in crashes
  - Optimisation of heavy duty vehicles for alternative fuels use
  - Next generation electric drivetrains for fully electric vehicles
  - Electric vehicle user-centric design for optimised energy efficiency
  - Physical integration of hybrid and electric vehicle batteries
  - Multi-level modelling and testing of electric vehicles and their components
  - Electrified urban commercial vehicles & fast charging infrastructure
  - Aerodynamic and flexible trucks
  - Multi-brand platooning in real traffic conditions
  - Energy efficiency and emission control in waterborne transport
  - Complex and value-added specialised vessels (e.g. ferries, workboats, etc.)
  - Ports of the future
  - Innovative ICT solutions for future logistics operations
  - Potential of the physical internet

- Climate change & environment
  - From climate service concepts to piloting and proof-of-concept
  - Integrated regional modelling and climate prediction system
  - Towards a robust and comprehensive greenhouse gas verification system
  - Nature-based solutions for hydro-meteorological risk reduction
  - Coordination of citizens' observatories initiatives

- Security
  - Cryptography
  - Addressing advanced cyber security threats and threat actors
  - Privacy, data protection, digital identities
  - Risk-based screening at border crossing
  - Architectures and organizations, big data and data analytics for customs risk management of the international goods supply chain trade movements
  - Public acceptance of “no gate crossing point solutions”

- SSH
  - R&I in support of sustainability and governance
  - Statistical data on bio-based industries/products
  - Sovereignty and democracy, and legitimacy through the rule of law, delivery of justice and fundamental rights
  - Data-driven policy-making/modelling/implementation
  - Science diplomacy and intercultural relations
  - Shifting global geopolitics and preparedness for managing risks, mitigation actions and fostering peace
  - The Asia-Pacific as a strategic region for Europe
  - Science education outside the classroom
  - Building a future science and education system fit to deliver to practice in agriculture, forestry and related value chains
  - Empowering young innovators
  - Participatory approaches and social innovation in culture

Brexit!

- The UK is still a full Member of the EU!!!!
- However… the future is full of risks
  - Will the UK retain full membership to H2020 (like Norway), or partial membership (like Switzerland), or a third country (like Australia)?
  - Ongoing projects could be jeopardised, since country contributions to the programme budget are annual
  - Be cautious of proposals with a UK coordinator, and have fall-back strategies in case the UK partner(s) need to withdraw

The future

- Next round of calls (for 2018-2019)
  - Early drafting is happening *now*, available in circulation in ~Q2 2017, published mid/late 2017
  - Potential focus areas:
    - Biotechnology as the next wave of disrupting technologies
    - Migration and changing demographics
    - Hyper-connectivity and Big Data driving accelerated change and innovation
    - Falling cost of energy
    - Health as a major driver
    - Facing climate change, oceans and space as pacifying/unifying projects
    - Primary sector innovation: strategic and key for sustainability and well-being
    - A state of instability as the new norm in global society

Beyond H2020

- FP9, 2021-2018
- Possible inclusion of dual-use technologies
- Incentives for third countries
- For some detail, take a look at: *sciencebusiness.net/news/79966/EU-Commission-sketches-possible-directions-for-FP9*

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