The European Union’s Research And Innovation Programs

How is HORIZON 2020 progressing?

Dr Rado Faletič
Director, Projects & Communications
Montroix Pty Ltd
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
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

• 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](http://cordis.europa.eu/projects)
# How is H2020 packaged?

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European Research Council

- [erc.europa.eu](https://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%)

[Link to European Commission website] 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

c.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
  – CO₂ utilisation to produce added value chemicals
  – New electrochemical solutions for industrial processing, to reduce CO₂ 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
www.montroix.com

Dr Martin Grabert, CEO
martin.grabert@montroix.com

Dr Rado Faletić, Director, Projects & Communications
rado.faletic@montroix.com