

Discovery Grants – the Solids Subcommittee

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Overview

- Focus Areas
- Excellence of Researcher
- Merit of the Proposal
- HQP
- How \$ Are Allocated
- Advice for Young Researchers, NRC & Similar

Example Areas and Titles

- **Robotics**
 - Design of an Intelligent, High-Precision and Reconfigurable Cable-Driven Parallel Robot manipulator
- **Biomechanics**
 - A novel biomechanical model of the human knee joint for a full range of knee flexion
- **Vehicles**
 - Research on Road and Railway Vehicle Systems
- **MEMS**
 - Dynamic Characterization and Uncertainty Quantification of a Class of Angular Rate Sensing and Switching Systems

Example Areas and Titles

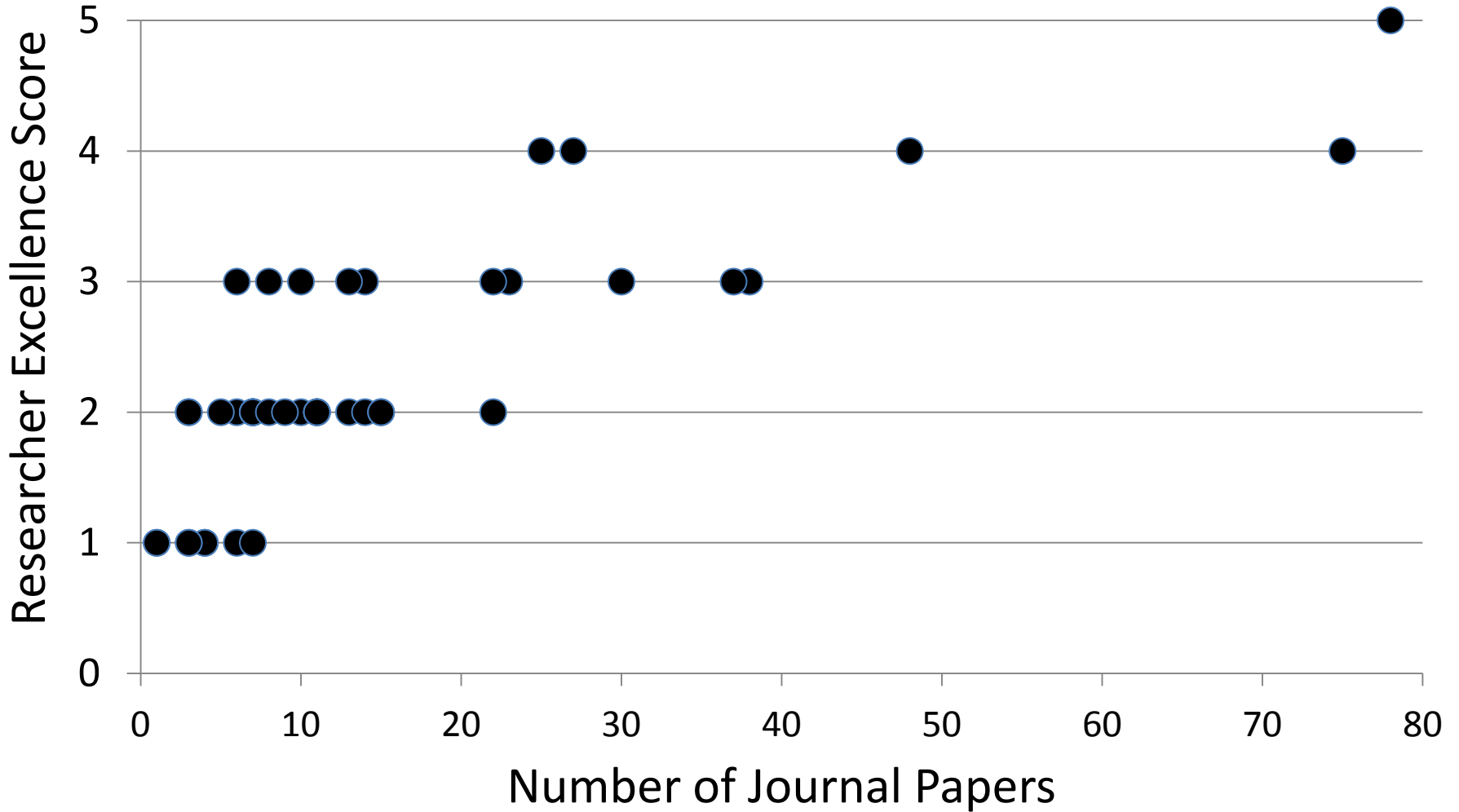
- **Materials**
 - Shape Memory Polymer Composites with Complex Fibre Architectures
- **Manufacturing**
 - Flexible Computerized Fixture for Machining
- **Design**
 - Computer support for collaborative knowledge building in engineering design
- **Automation and Controls**
 - Robust and Optimal Control of Robotic and Aerospace Systems in an Input-Output Framework
- **Cross Fields**
 - Development of Automation and MEMS Technologies for Biomedical Engineering

Excellence of Researcher

Publication Record

- Not at all a ‘paper-counting’ exercise
- Up to applicant to demonstrate impact
 - Lists alone are (relatively) unimpressive
 - Explain impact (citations, uptake, etc)
- Explain publication/conference venue choices
 - Identify high-impact conferences (like journals)
 - Avoid questionable venues
 - Be careful of low volume numbers
 - Explain (don’t hide) relationships with editors
- Explain author order / your contribution
- Explain collaborations (esp if with related/not-obviously-complementary colleague)

Scores vs Papers



Patents and Industrial Transfer

- Potentially highly valued
- Must carefully distinguish between:
 - Provisional applications
 - Full applications
 - Issued applications
 - Abandoned applications
 - Patent families
- Emphasize impact
 - Industrial interest, uptake, use
- Describe use of research, inventions, innovations
- Entrepreneurial activity (startups, etc)

Merit of Proposal

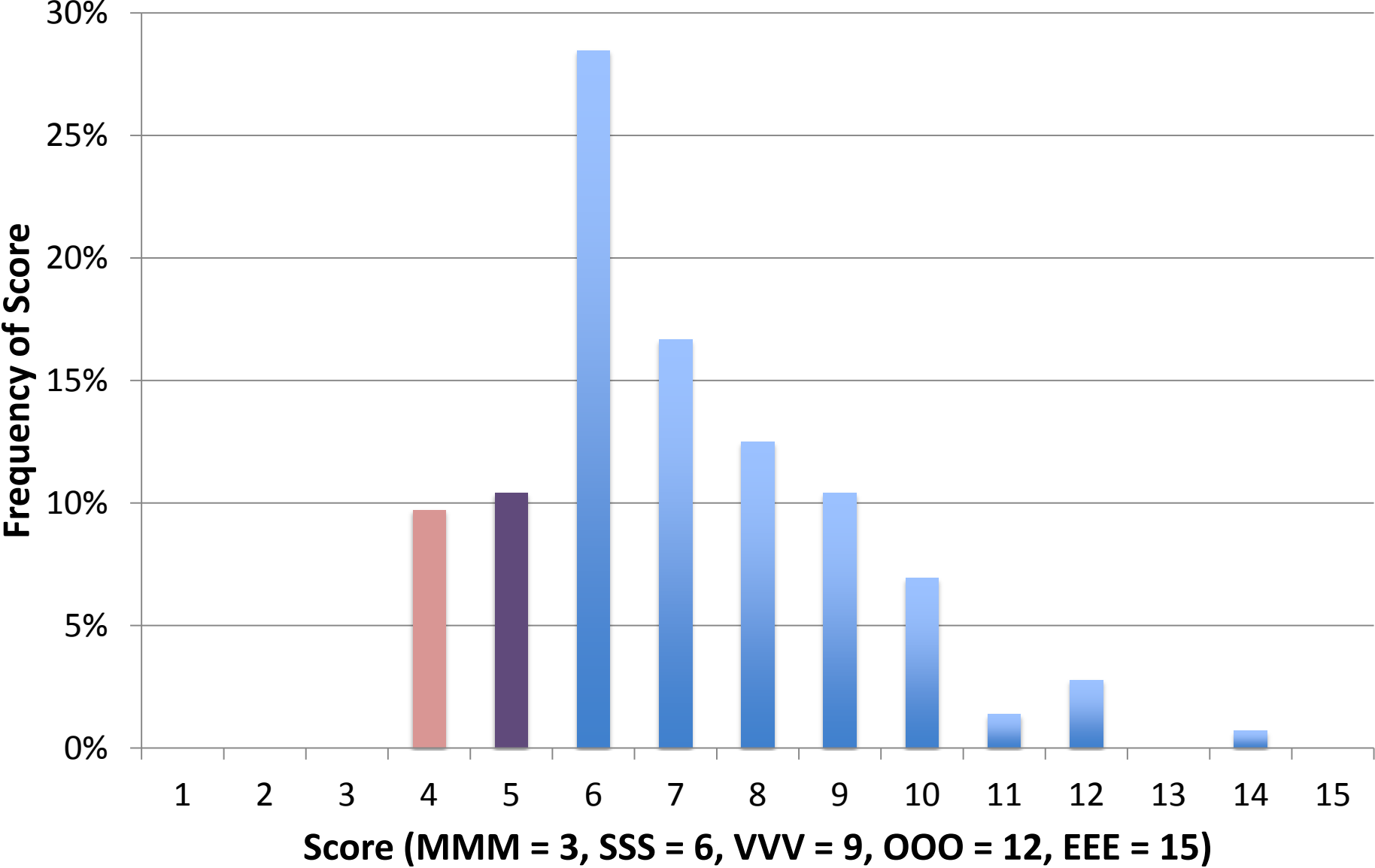
- Be specific about expected impact, and support
 - Eg, don't just say "Hip replacements cost \$X billion per year"; estimate value of your proposed work
 - Show awareness of related efforts
- Budget
 - I agree with Larry! Main message: 'Don't screw up!'
 - Don't plan to spend lots on travel, equipment, techs
 - Identify a reasonable level – up to twice what you expect
- Not the time to propose a fresh area where you have little expertise
- Reviews taken with grain of salt
 - Comments must be specific and justified

HQP – What I Look For

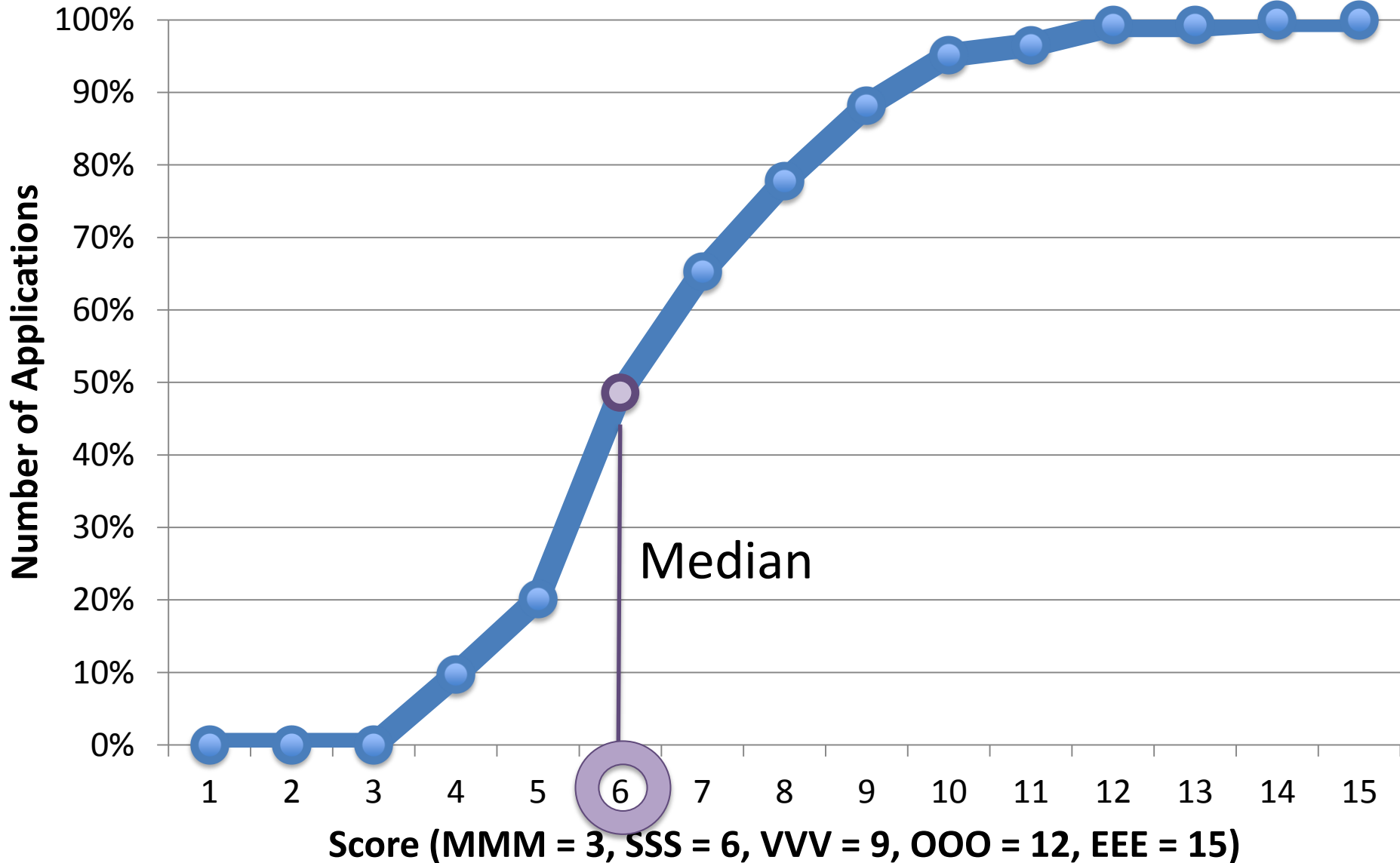
- # and type of students/trainees
 - Distinguish between non-thesis and thesis-based students
 - Balance between sole and co-supervised students
 - Avoid listing senior project students*
- Placements
 - Emphasize strong placements
 - Explain anything strange (long time to graduate)
- Publications, Conferences, etc
 - Are students getting good research training?
- Tasks
 - Project planning, appropriate allocation of tasks
- Environment
 - Why is your lab a good place for students to train?
- Supervision Style (esp important for large groups)

How \$ Are Allocated

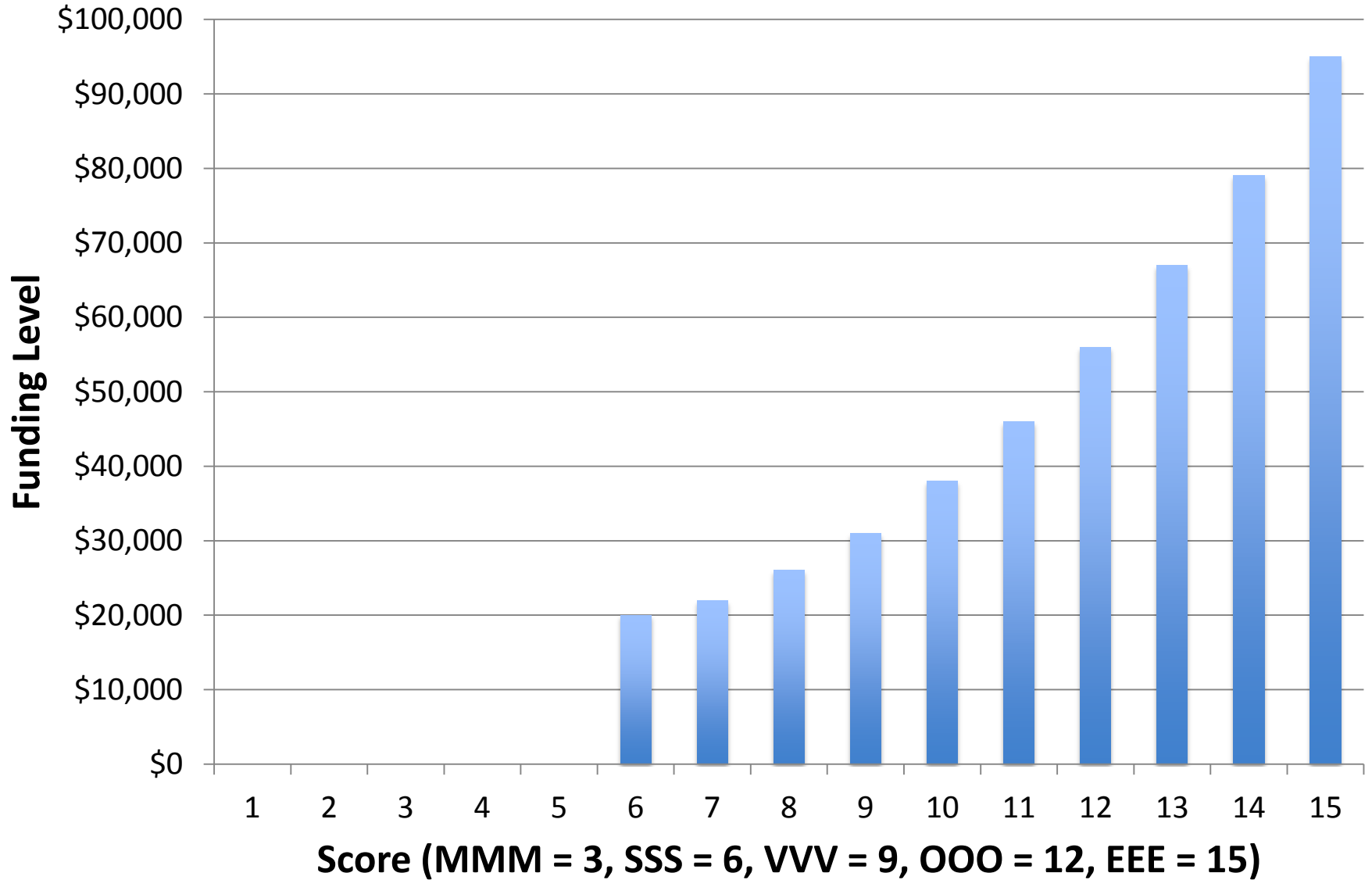
Histogram of Scores



Cumulative Distribution of Scores



Funding vs Total Score



Plight of Young Researcher

- Need 5 points for funding in first 2 years
- Generally hard to get more than M on HQP
- S on Researcher Excellence usually requires 5+ papers
- Often make mistakes on proposal
- MMM is very common
- Miss again in second year, no longer 'early career'
 - Bar gets raised
- Heads:
 - Arrange co-supervisions right away (upon hiring)
 - Have students in place for primary supervision
 - Early (mandatory?) review of applications
 - Push PhD/Postdoc paper submissions

Advice for NRC & Similar

- Often low on publications
 - Try to publish before going for DG
- Often low on HQP contributions
 - Get (co-)supervision experience in advance
- Less experience in writing competitive grant applications – frequent mistakes in proposal
 - Get early reviews

Questions?