



Understanding the biology of disadvantage

New research at **UCD's** Geary Institute will look at education and health inequality at a very fundamental level, writes **John Holden**

THE GEARY Institute at University **College Dublin** has been awarded €2.5 million by the European Research Council (ERC) for a five-year project entitled, *Understanding health across the life course: an integrated developmental approach*. Combining the expertise of biologists, neuroscientists, psychologists, sociologists and economists, the project will be headed by Nobel prize-winning economist from the University of Chicago, Prof James Heckman.

"I've been working in the area of early child development now for several years," says Heckman. "My dealings with **UCD**, in particular with the Geary and **Conway institutes**, have been over the last six years and much of the research already happening on campus was of interest to me."

The new project aims to look at health inequalities at a fundamental level.

"There are very clear connections between genes and inequality that we're only beginning to understand now," says Heckman. "A very simple connection is at school where students are given information."

"Children learn cognitive traits like reading and writing and, therefore, they understand better warnings about issues such as smoking and eating unhealthy foods.

"But they also learn self control and discipline and those things are extremely important. So we're looking at what the genetic effect is of sending a child to school and engaging in healthy behaviour - it boosts both cognitive and non-cognitive skills and this isn't sufficiently appreciated," adds Heckman.

"We already know that the role of our genes is affected by the environment. So disadvantaged children have their genetic

constitutions compromised. We know that children who grow up in severe and difficult environmental conditions tend to be affected in a whole range of ways.

"Genes by themselves don't do anything except build proteins. What's important is the process of how genes convert into proteins that can be heavily altered by an adverse environment. One example of this is the MAO-A gene. Criminals are more likely to have a particular version of it. And indeed it's true that there is a correlation between this gene and criminal behaviour but it has been shown that it only has a negative impact if children are raised in adverse environments. In other words, the gene itself is powerless without the environment."

The same logic can then be applied to health inequality. "Some people have more genetically impaired immune systems than others," says Heckman. "Poor health experiences can be inherent across a generation.

"Adverse conditions two generations ago can make their presence felt in the current generation. Again this is something we're only at the beginning of understanding - the biology of disadvantage. It can literally get under your skin."

The location of this research in **UCD** puts Ireland in a strong position within Europe to lead the way in early childhood development studies.

"Right now no other country in Europe has such good early intervention projects being carried out," says Heckman.

"Notwithstanding the current economic trouble, Ireland is in a very good position to ring-fence this type of research and have a distinctive Irish academic policy theme of early childhood development. Its findings will also

be important in preparing the next generation of Irish workers."

The bringing together of so many disciplines is the other innovative aspect of this project.

"One of the major challenges for us is to find a common language we can all understand," he says. "There can be so much jargon in fields like medicine or psychology or economics that we need to find common ground on which to understand each other."

But Heckman is not new to crossing disciplines. "A lot of the research done by Heckman as an economist has been in the area of human development from a biological perspective," explains Colm Harmon, director of the **UCD** Geary Institute.

"Plus we have access to data we never did before," he adds.

"We're starting to measure datasets that include genetic data and information on things like inter-generational poverty and educational movements."

With this type of approach in mind, the Geary Institute will have the funding to support a team of eight PhD and postdoctoral students working for the next five years.

"It is not a straightforward matter to be awarded funding from the ERC like this," stresses Harmon. "Around 90 per cent of applications are rejected."

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Nobel prize-winner Prof James Heckman is an expert on the impact of environmental factors on behaviour