

Citizen science helps unlock European genetic heritage

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A University of Sheffield academic is helping a team of citizen scientists to carry out crucial research into European genetic heritage.

Citizen Scientists are not required to have a scientific background or training, but instead they possess a passion for the subject and are increasingly being empowered by the scientific community to get involved in research.

Dr Andy Grierson, from the University of Sheffield's Institute for Translational Neuroscience (SITraN), has helped a team of citizen scientists from Europe and North America to identify vital new clues to tell the story of Europe's genetic history.

Dr Grierson explained: "Understanding European history since man first arrived on the continent is a huge challenge for archaeologists and historians.

"One way that scientists can help is by studying the genetics of European men. All men carry a [Y chromosome](#) that they inherit from their father, which has been passed down the generations from father to son for thousands of years. So most men in Europe will share common ancestry at some point in the past, and we are able to investigate this shared ancestry using [genetic studies](#) of the Y chromosome.

"However, up until recently, there have not been many [genetic clues](#) on the Y chromosome to allow scientists to be certain about identifying

different populations."

The team has addressed this problem by downloading human [genome](#) data obtained by the 1000 Genomes Project from the Sanger Centre in Cambridge. Then, working on their home computers, they managed to extract 200 novel genetic variants from Y chromosomes of the most numerous group of western European men.

By determining the patterns of these markers in each of the 1000 Genomes Project samples, the team was able to draw up a new family tree for the majority of men in Western Europe.

The group hopes that this resource will allow a much more detailed analysis of migration and expansion of populations in Europe. For example, some of the new [genetic markers](#) may help to study the origins and movements of different historical and cultural groups such as the Celts.

Dr Grierson added: "This community-led approach to genetic research could easily be adopted by other research areas. In particular, the 1000 Genomes Project has made the whole genome sequence of more than 2,000 individuals freely available for research purposes. These sequences potentially contain new information that will give important insight in diverse disciplines such as clinical medicine and evolutionary biology.

"One problem is that the amount of data analysis involved is huge, so working in partnership with [citizen scientists](#) allows us to move forward far more rapidly. There are thousands of science graduates, who for one reason or another have pursued non-scientific careers. Getting involved in citizen science projects is one way that these people can re-engage with research. Likewise many people with careers in IT and computing already have the sorts of skills required for analysing whole genome

sequences in projects like ours."

Richard Rocca from Saddle Brook in New Jersey, USA, a community scientist involved in the project, said: "By searching through vital records such as birth certificates, many of us can trace our ancestry back several generations. The task is very time consuming, especially for those, like me, whose ancestors left Europe many generations ago. As gratifying as the results may be, once the paper trail ends, we are left to wonder about our deep ancestry. By working together, we were able to add many levels of detail to the genetic tree. I have no doubt that this new information will help some of us trace our individual ancestries back into pre-history."

Greg Magoon, from Manchester in Connecticut, USA, another community scientist involved in the project said, "It's a very exciting time for this field. The development and use of new genome sequencing technologies over the last few years along with the public availability of data obtained with these technologies, particularly from initiatives like the 1000 Genomes Project, are enabling us to make rapid progress in our understanding of historical human migrations and paternal lineages. We've tried to show how such progress can be facilitated by an engaged community of individuals, with varied and complementary skills, connected via the Internet."

More information: The research is published in *Plos ONE* on 24 July 2012 and is available at: [dx.plos.org/10.1371/journal.pone.0041634](https://doi.org/10.1371/journal.pone.0041634)

Provided by University of Sheffield

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