

[Interview] Anna Barford, Worldmapper Project, University of Sheffield, U.K. - by Roberto Spiezio – OhmyNews International

Anna Barford, please introduce yourself to OMNI's readers.

Hello. I'm Anna Barford, I work on a world mapping project run between researchers at the University of Michigan in the United States and the University of Sheffield in the United Kingdom. I'm part of the British contingent, so am writing to you from sunny Yorkshire.



**Could you tell us something about the Worldmapper Project, its history, purposes, and developments?**

The world maps that we produce resize each country according to the topic that is being mapped. This contrasts with more conventional maps where land area is shown. We've generated 108 maps already, and by the end of 2006 there will be 365 maps of the world freely available on our Web site.

The project is led by Danny Dorling and Mark Newman. Both are interested in new mapping techniques, and were working separately but simultaneously on this type of map. They decided to work together, which means that what can be produced is a project with much greater scope. ▲ Anna Barford

The project is built on two recent developments. Firstly, Mark Newman and Michael Gastner produced a density-equalizing algorithm, which means that these maps can be made quite quickly and accurately. The other development is that there has recently been a huge increase in the quantity of data that is available from United Nations agencies. This data is used to make most of our maps.

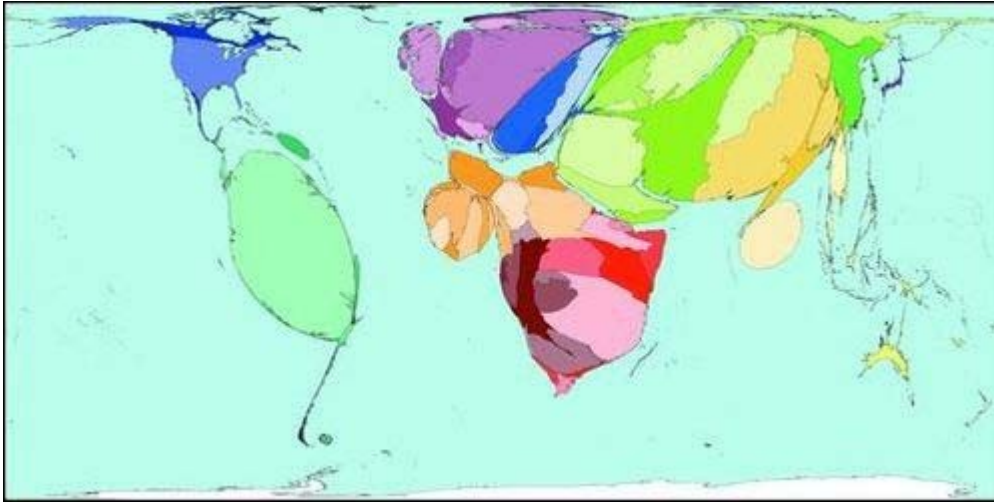
The purpose of the project is to create maps that describe how the world fits together, in terms of a range of variables. These maps are a quick and interesting way of accessing large amounts of data.

**Who is involved in this project?**

The group work on this project consists of the following people:

- Danny Dorling, University of Sheffield -- Danny has done much work in the development of cartograms and human cartography, and was responsible for devising this project and the huge task of gathering all of the required data.
- Mark Newman, University of Michigan -- Mark is an associate professor of Physics and Complex Systems at the University of Michigan, and a member of the University of Michigan Center for the Study of Complex Systems. Together with his Ph.D. student Michael Gastner, Mark developed the algorithm that is used in transforming the normal world map into this series of cartograms. Mark also wrote the computer software for making the cartograms and produced the maps themselves using the data gathered by Danny.
- John Pritchard, University of Sheffield -- John provides technical and research support for the Social and Spatial Inequalities Research Group (SASI Group). He developed the Worldmapper Web site, and also works a lot with the data.
- Ben Wheeler, University of Sheffield -- Ben is a research fellow working with the SASI Group. He gives advice and checks the accuracy and quality of the information presented.

- Graham Allsopp, University of Sheffield -- Graham is chief cartographer in the Geography Department at the University of Sheffield. His expertise in all things relating to maps and design has been utilized in many aspects of this project, particularly in the design of the posters.
- Anna Barford, University of Sheffield -- I write the informative text that accompanies each map, source the quotes used, and produce the posters. I also help to oversee the project and do media-related tasks, like interviews.



▲ Map drawn to show the global proportion of refugees and internally displaced persons living in various regions.

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### **Where do the funds come from?**

This project is indirectly funded by the Universities of [Sheffield](#) and [Michigan](#). Direct funding was also awarded to Danny Dorling for this project, by the U.K.-based [Leverhulme foundation](#).

### **The idea of finding alternative ways to draw maps is not new. Why is Worldmapper any different?**

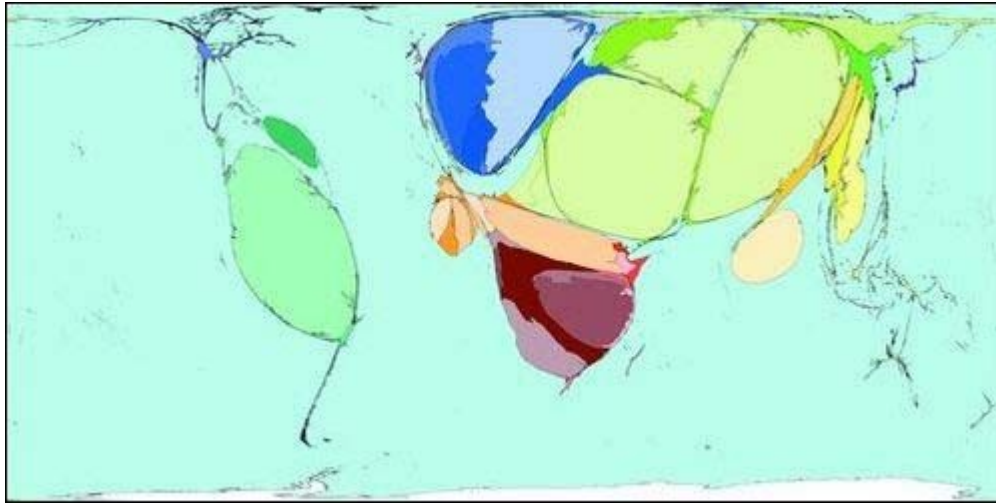
You're right. Over time our three-dimensional planet has been represented in various two-dimensional ways. The sixteenth century Mercator projection is widely recognized. Mercator preserved angles between places, facilitating navigation for sea-based trade (i). His map roughly coincides with the beginnings of the modern capitalist world-system (ii).

Mercator's map distorted the relative size of countries, making countries that are located towards the poles larger than those at lower latitudes. The 1974 Peters' Projection was so radical because, in contrast to the then-popular Mercator projection, it gave an accurate representation of the true land area of countries.

Maps have been used to show other variables by coloring territories or resizing symbols that represent territories. For example the recent "State of the World Atlas" by Dan Smith uses some maps where countries are resized according to variables other than territory, such as the population that lives there. Smith uses rectangular shapes to represent countries -- these are labeled to assist the legibility of his maps.

In this he has followed the revolutionary thinker, Michael Kidron from the U.K., who with others produced an atlas in the 1980s. Others have worked to maintain the country boundaries to a greater extent, while showing the population. An example of this is Danny Dorling and Bethan Thomas's work on the U.K.

Our world maps represent the values of variables by changing territory sizes whilst roughly maintaining the shape of territorial boundaries. The originality lies in the algorithm used for these maps (iii) which is based on a diffusion model (from the physics of heat transfer and molecular mixing) to divide the total area on the map, less a constant area allocated to the oceans, between the territories. This algorithm is unique in both the speed with which maps are produced and the accuracy of the maps themselves.



▲ World map with territory size drawn to reflect percentage of globally displaced persons from region of origin.

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### **What are Worldmapper's practical applications?**

The maps are images that describe the distribution of a variable around the world, thus enabling people to understand many of the different aspects of life. These variables include categories such as health, trade, food, movement, wealth, violence, destruction, disasters, transport, and many others.

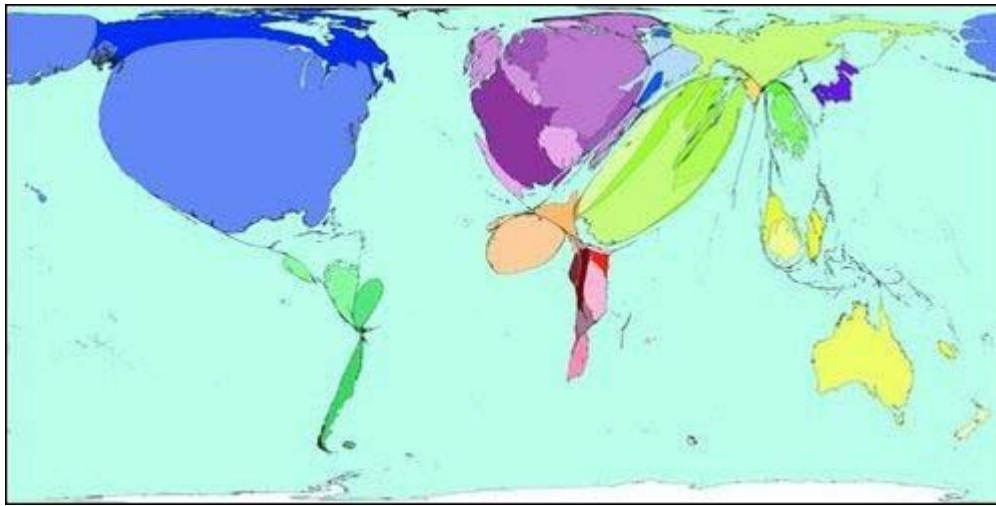
Because of the wide coverage of these maps it is likely that they will be informative and interesting to a great range of people. They have been used by journalists, teachers, students, universities, non-governmental organizations, and businesses. Often the maps have been used as illustrative and thought-provoking images.

With regards to the use of these maps, we hope that seeing one of them could quickly direct someone to information about an area of study, without spending many hours researching that area. For example, if someone wanted to study where displaced people live they could view the refugee destination map, and from that glean a quick understanding of where it might be interesting to base their research -- there are many displaced people living in the U.K., but very few living in Ireland.

These maps could quickly generate research questions, for example, "Why does Chile have net emigration while Argentina does not?" Looking at maps in relation to each other adds new possibilities for question generation.

Maps can have a very strong effect on our geographical imaginations -- currently if you imagine what the earth looks like, you are likely to come up with the "earthrise" photograph or a land area map. These world maps offer other possible ways to think of our planet, which incorporate elements of our lives and not only the physical attributes of the earth.

Further, people have a right to see the data that these maps present, and a responsibility to understand their own positions in relation to other people. As [Rosa Luxemburg](#) (1871-1919) stated, "The most revolutionary thing one can do is always to proclaim loudly what is happening" (iv).



▲ Map showing global net immigration.

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**Please describe in more detail how the data aggregation process works, and how a map is drawn.**

Here is the recipe for one world map:

1. Source the data. Usually this can be found in the appendix of a United Nations agency's report.
2. Check that the numbers reported seem realistic. This can be done by estimating what the numbers are likely to be, or by cross-checking with another source.
3. If there is missing data either refer to another source or estimate it. Estimations should usually be made by taking the rate for the region, such as deaths per thousand, then multiplying this rate by the population of the country that is missing data. We deliberately do not use complex estimating procedures so as to be transparent (i.e. in this case we don't use age or sex disaggregation).
4. The form of the data must be in counts rather than rates, because rates cannot be mapped.
5. Re-check the data, and put it into the format to be made into maps. Then send data to Mark Newman in the United States.
6. Turn data into maps using Mark Newman's algorithm. Starting with an outline of a world map, countries are shrunk and expanded depending on the proportion of the variable found there. Decisions about the territorial boundaries, colors, and the total land area available have already been made and are consistent between maps.
7. Send maps to the U.K.
8. Make maps into posters, adding descriptive notes, graphs, tables, technical notes, a reference land area map, and a relevant quote.
9. Write detailed technical notes. Tidy data sheets.
10. Carefully check the details of posters, data sheets, and technical notes.
11. Make any necessary corrections.
12. Display on Web site.

Detailed technical notes for each map and the data used are available on the Worldmapper Web site.

## Could you specify some of the typical data sources?

Most of our data comes from United Nations agencies. Some of the main data sources that we use are as follows:

- The United Nations Development Program's Human Development Report.
- The World Bank's World Development Indicators.
- The World Health Organization's World Health Report.
- The United Nations Conference on Trade and Development's Handbook of Statistics Online.

**The maps are very useful if you want to have an immediate overview of a certain subject, such as wealth growth or gender empowerment. But I feel figures are still needed to quantify the visual data. What is your view about this problem? Do you think this might be a development of the project?**

Yes, you're right that the maps while presenting a wealth of information could be complimented. Our maps are sophisticated pie charts, the ability to show proportions is great, but it is also interesting to know totals and rates.

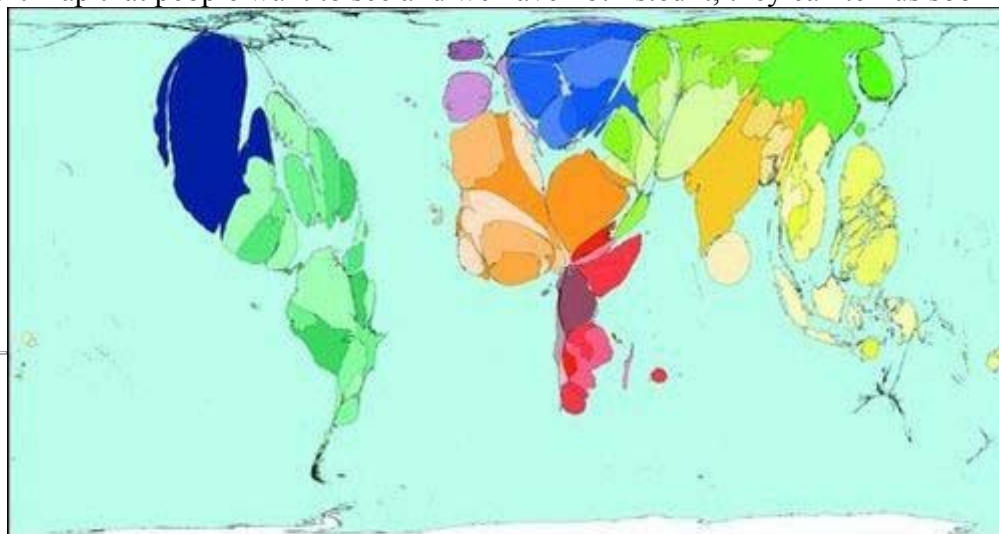
We produce a poster of every map, intended to "flesh out" the information on the map. The poster gives a descriptive note of what is happening on the map, to assist with interpretation. There is a graph which allows the comparison of regional data. There is also a top 10 and bottom 10 table showing the rates of the variable. A small land area map is included to assist with the identification of countries on the main map. Brief technical notes are provided, and lastly, there is a quote which gives a human face to the variable. These posters are freely available on the Internet, and can be printed and displayed.

We would like to make our Web site much more interactive, and are currently developing ideas about how to do this.

## Any future plans for the Worldmapper Project?

Our current plans are focused on making more maps -- we are still working on the content of the last categories of maps. Others are starting to exhibit our maps, so hopefully more of that will be happening.

There is a page of our Web site showing map categories, including some of the future maps that will be made. If there is an important map that people want to see and we have not listed it, they can tell us soon before the final maps have been planned.



▲ Map showing global net emigration.

The article is scheduled to appear on the [Worldmapper Project Web site](#).

NOTES

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(i) Daniel Dorling and David Fairburn (1997) "Mapping: Ways of representing the world." Longman, Harlow

(ii) Immanuel Wallerstein argues that there have been three historical eras, the third beginning in 1500. During this third period the capitalist world-economy spread to encompass the globe. Immanuel Wallerstein (1996), "World System versus World-Systems: A Critique." In Andre Gunder Frank and Barry K. Gills, eds., *The World System: Five hundred years or five thousand?*, Routledge, London (1996).

(iii) M. T. Gastner and M. E. J. Newman (2004) "Diffusion-based method for producing density equalizing maps." In Proc. Natl. Acad. Sci. USA 101, pp.7499-7504. Available at [www.worldmapper.org](http://www.worldmapper.org)

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