Institution: University of Southampton

Unit of Assessment: 29 English Language and Literature

Title of case study: 29-03 Literature, Culture, and Biomedicine

1. Summary of the impact

Research carried out by the University of Southampton into the cultural implications of eugenics and epigenetics has contributed to a greater public understanding of heritability, and built a foundation for an accurate, informed dialogue between the humanities and the sciences. Specific impacts have included the establishment of forums for dialogue between writers, biomedical scientists, creative practitioners, and the general public, and the provision of tools for teachers to address biomedical ethics issues at secondary school level in New Zealand.

2. Underpinning research

In the 60 years since Francis Crick and James Watson discovered the double-helix structure of DNA, advances in gene science have revolutionized medicine but also raised huge ethical and philosophical questions. Are some people genetically preconditioned to act criminally? Is it right to have an additional child to provide organs or bone marrow for a sick sibling? The reciprocal relationship between science and cultural representations of these issues has been the focus of complementary research projects by Clare Hanson, Professor of Twentieth-Century Literature (appointed 2006) and Peter Middleton, Professor of English (appointed lecturer in 1984) at the University of Southampton's Department of English.

In the research for her monograph *Eugenics, Literature, and Culture in Post-war Britain* (undertaken 2007-11; supported by grant 1), Hanson mapped the socio-political factors which supported the dominance of a gene-centric model of inheritance in the period after World War 2. She examined the papers of the Eugenics Society and the Family Planning Association, held by the Wellcome Institute (one of the world's major centres for the study of medical history), and demonstrated the overlap between eugenic thought and the post-war British government's concern for the health of the nation. She shows that, despite recognition of the role that eugenics had played in Nazi atrocities, eugenic thought in Britain persisted and became intertwined with research in genetics, discourses of race and overpopulation, and educational and social policy. Hanson argues 'eugenics is not … a science, but a social and cultural movement', and identifies iconic works of literature, such as Anthony Burgess's *A Clockwork Orange* and John Wyndham's *The Day of the Triffids,* that express eugenic ideas while offering a cultural space in which to explore public anxieties.

In his project 'American Poetry and Science in the Cold War' (2007 to date; grant 2), Middleton focuses on the use of literary and linguistic metaphors in the writings of twentieth-century physicists and molecular biologists (such as their use of the term DNA 'code'). He is also investigating the use of popular scientific concepts in poetry. He has shown how the form and content of work by the New American poets of the 1950s and 1960s was influenced by the cosmological ambitions of nuclear physics and the threat of nuclear war. Charles Olson, for instance, described poetry as 'high-energy discharge'. Key insights are that the New American poets saw their poems as critical engagements with key developments in physics, and that the work of the next generation of poets was informed by advances in molecular biology. For example, Lyn Hejinian experimented with poetic form to explore the human, conceptual, and aesthetic implications of the linguistic model of DNA.

Working together on 'Beyond the Gene' (2011 to date; grant 4), Hanson and Middleton are examining the cultural implications of current research in epigenetics - the study of changes in gene expression caused by mechanisms other than changes in the underlying DNA sequence. Leading a team of biomedical researchers, humanities scholars, and creative practitioners, Hanson and Middleton are exploring the role of the literary humanities in developing public understanding

of recent advances in biomedical research. A key part of this work is to encourage scientists and the public alike to discuss the cultural ramifications of biomedical research. This includes identifying how creative writers such as A.M. Homes (*The Mistress's Daughter*), Jeanette Winterson (*Why Be Happy When You Could Be Normal?*) and Jackie Kay (*Red Dust Road*) have responded to shifts in the scientific and cultural understanding of human inheritance and familial relationships.

3. References to the research

Publications

Middleton and T. Woods, *Literatures of Memory: History, Time and Space in Post-War Literature* (MUP 2000), 323 pp.

Hanson, 'Reproduction, Genetics and Eugenics in the Fiction of Doris Lessing', *Contemporary Women's Writing 1-2,* December 2007, 171-84; published after the internal submission date for RAE 2008 but available from the University of Southampton.

Hanson, 'Biopolitics, Biological Racism and Eugenics', in Stephen Bending and Stephen Bygrave (eds), *Rethinking Foucault in an Age of Terror* (Palgrave, 2008), 106-17.

Middleton, 'Strips: Scientific Language in Poetry', *Textual Practice* 23:6 (2009), 947-58.

Middleton, 'Cutting and Pasting: Language Poetry and Molecular Biology', In John Holmes (ed.) *Science in Modern Poetry: New Directions* (Liverpool University Press, 2012), 38-54.

Hanson, *Eugenics, Literature, and Culture in Post-war Britain* (London and New York: Routledge, 2013), 190 pp.

Grants

1. PI: **Hanson**, 'Eugenics, Literature, and Culture in Post-war Britain', AHRC Matching Leave, 3 months, 1 Feb-31 May 2007 (excluding 1-30 April vacation period), £25,670.

2. PI: **Middleton**, 'American Poetry and Science in the Cold War', AHRC matching leave award, February-June 2009, £34,122.

3. **Hanson**, Seelye Visiting Fellowship, University of Auckland, May 2010, $NZ 27,000.

4. PI: **Hanson**, CI: **Middleton**, 'Beyond the Gene', AHRC Exploratory Award in Science and Culture, 6 months, 1 April-20 Sept 2012, £23,787.

4. Details of the impact

As a direct result of their research, Hanson and Middleton have provided opportunities for the scientific and literary communities to engage with one another, promoting a deeper understanding of how they can work together to enhance public understanding of gene science, biomedicine, and 'who we are'.

Influencing the methods and ideas of biomedical researchers and clinicians

In June 2012, as part of 'Beyond the Gene', Hanson and Middleton organized a workshop for 24 leading medical and biological researchers in epigenetics to exchange ideas with a philosopher of science, a poet, and literary scholars. Plenary sessions covering scientific thinking, as well as arts and humanities perspectives, resulted in a summary report on the implications of epigenetics for rethinking inheritance across the fields of medicine, evolution, and culture. Wolf Reik, an epigeneticist at the Wellcome Trust Sanger Institute, said in feedback that the workshop had led him to consider more critically the language he uses in presenting his research to the public [5.1].

In September 2012, 90 people attended a fully booked 'Beyond the Gene' public event at the Linnaean Society, London, organised by Hanson and funded by the AHRC. It featured the novelist Jeanette Winterson, the philosopher Evelyn Fox Keller, and the clinical geneticist Tim Spector, and

provoked heated debate on the subject of how epigenetics calls into question our understanding of genetic inheritance. The molecular biologist Marilyn Monk commented: 'Often when a field becomes fashionable a lot of incorrect ideas are propagated by people who do not really know the subject.' This opened up questions about the reliability of popular science writing. Feedback following the event indicated many delegates had found the discussion both challenging and informative [5.1].

Hanson also took part in an experimental workshop on 'Genes and Attitudes' for approximately 35 biomedical researchers and obstetricians at the University of Bergen in April 2013. Hanson's presentation drew on press reports about sperm and egg donors being urged to reveal their identity to biological children. In feedback, one gynaecologist commented that the event had generated an increased 'understanding of perspectives not thought of in science'. Other scientists commented on the value of the arts in 'reaching new readers' to develop understanding of scientific practices and advances [5.2].

Contributing to a wider public understanding of heritability

In May 2010, Hanson was invited to deliver a public lecture, 'Eugenics, Literature, and Culture', in Auckland, New Zealand, to an audience of 150 secondary school teachers, scientists, and members of the general public. Her lecture included an analysis of Jodi Picoult's popular novel *My Sister's Keeper,* which prompted a lengthy debate on the ethics of genetic screening and the creation of 'saviour siblings' [5.3; 5.4]. Among the audience was Jacquie Bay, Director of the Liggins Education Network for Science, University of Auckland. Bay said 'I received feedback from a number of colleagues on the value of the lecture in stimulating ideas around the teaching of ethics.' Bay went on to develop a secondary-school programme for students from low socio-economic backgrounds and minority ethnic groups in NZ, using Hanson's analysis of *My Sister's Keeper* and mapping it against a case-study of a Maori community. To date, 100 students have followed the programme [5.5].

Hanson discussed her book *Eugenics, Literature, and Culture in Post-war Britain* in a podcast for the *BBC History Magazine* website (approximately 30,000 hits), and on Radio 4's *Making History* programme, 14 May 2013 [5.6]. Middleton authored a 9,000 word entry on 'Science and Poetry' for the 4th edition of the *Princeton Encyclopedia of Poetry and Poetics* (2012), a standard global reference work for publishers and poets; 3,500 copies sold as of 1 March 2013 [5.7].

Middleton contributed to the forum 'Like a Metaphor: Ongoing relations between "poetry" and "science"', focusing on 'how poetry can serve science' and 'how science can serve poetry' in the international online poetry magazine *Jacket2* (March 2012; 554 visits as of July 2013). Marcella Durand, one of the 11 participating poets commented: 'I agree with Peter that all of my poems are based in science, or ARE science' [5.8; 5.9].

In July 2012, Middleton gave a talk on Lyn Hejinian's use of science to 100 scholars, publishers, poets, and teachers at a National Poetry Foundation event in Maine, USA. The poet Charles Bernstein wrote in his feedback, 'Middleton's work on science and poetic culture … offers ways for those of us doing art work to better understand our relation to the public, and to develop better ways of reaching the public' [5.9].

Hanson's continuing collaborations with colleagues in the biomedical sciences will benefit the public through a series of pre-show 'platform' lectures and discussions associated with the production of *A Number*, Caryl Churchill's play about genetic cloning. This will be a significant contribution to the Fulcrum Festival to be mounted by Nuffield Theatre, Southampton in spring 2014.

5. Sources to corroborate the impact

1. Summary report of participant feedback from the 'Beyond the Gene' workshop and public event are available from the UoA.
2. Workshop participants comments from 'Genes and Attitudes' are available from the UoA.
3. Weblink evidence for public lecture: http://www.liggins.auckland.ac.nz/uoa/home/events/template/event_item.jsp?cid=260314
4. For Auckland events, an email report from the Communications Manager, Liggins Institute, University of Auckland and the report Hanson wrote for the Seelye Trust are available from the UoA.
5. A detailed email from Jacquie Bay about the impact of Hanson's public lecture on her health literacy programme is available from the UoA.
6. Weblink evidence for Radio 4 programme *Making History* http://www.bbc.co.uk/programmes/b01sdg42 ; to download *BBC History Magazine* podcast http://www.historyextra.com/podcasts?page=3
7. *Princeton Encyclopedia of Poetry* sales figures letter available from UoA.
8. Poetry and science forum on *Jacket2* https://jacket2.org/feature/metaphor
9. Letters from poets available from UoA.