Global Faculty Initiative

The Faculty Initiative

seeks to promote the integration

of Christian faith and academic disciplines

by bringing theologians into conversation with scholars

across the spectrum of faculties

in research universities

worldwide.

www.globalfacultyinitiative.net

Disciplinary Brief

FINDING LOVE IN CHEMICAL DISCOVERY, THE MOLECULES OF LIFE AND CAREER TRAJECTORIES

Lorna Smith

Professor, Department of Chemistry, University of Oxford
Peacock Tutorial Fellow at St. Hilda's College, University of Oxford

In 'Love and Natural Sciences' Ian Hutchinson presents an excellent application of Oliver O'Donovans's Theology Brief 'The Sovereignty of Love' to those working in the natural sciences. It prompted me to go beyond theoretical considerations and think how this should work out in practice within my life as a scientist.

Biological Chemistry as an Expression of God's Love

As Hutchinson states, O'Donovan's definition of love as 'affective and directive attention to the good of persons' (God and our neighbour) initially seems to suggest that the significance of love may be limited to the interactions between practitioners in the natural sciences or its deployment in engineering, medicine etc. However, Hutchinson persuasively argues, firstly, that our joy in the intellectual challenge of understanding the laws of nature is in some small way a reflection of God's creative love and so an expression of the sovereignty of love. Secondly, Hutchinson proposes that the sense of awesome wonder that comes in scientific discovery and the love of nature are a response in love to God's craftmanship revealed in creation. To quote Romans 1:20: 'For since the creation of the world God's invisible qualities - His eternal power and divine nature - have been clearly seen, being understood from what has been made'. Hence in the study of the natural sciences we see and so respond to something of God's divine nature.

As a chemist working at the interface between chemistry and biology, I see an expression of God's love for humanity in the intricacies of the chemical principles used in perfection in the molecules of life. To give one example, some of my research has centred around heme proteins [1]. Here we see a fundamental transition metal chemistry principle, the swap from a high spin to a low spin iron (II) electron configuration on binding a strong field ligand, which is the initial trigger that prompts the allosteric behaviour of the protein hemoglobin. Hemoglobin has four subunits and the binding of oxygen to one subunit increases the affinity of the others for binding oxygen. This allosteric behaviour is so fundamental to life because it

enables hemoglobin to transport oxygen from our lungs to active muscles. The design of chemical fundamentals in such a superbly balanced manner, the choice of elements and molecules working together in harmony to perform a vital task in such an eloquent and beautiful manner, speak loudly of the creator God who chose in love that humans should be fearfully and wonderfully made.

This is just one small example of the continual opportunities that those with an open heart have to glimpse and respond to God's divine nature through studies of the natural sciences. It is a call to both increase and express our love to God who first loved us and to use the insights we are privileged to get from our research to prompt others to do the same.

Even in my secular university setting, I take time in my teaching of first year transition metal chemistry to point out the wonder of the high spin to low spin iron (II) configuration perfected in the mechanism of hemoglobin. I hope and pray that the students may look beyond wonder to the Creator. In addition, it is important to find opportunities to share our research outside the academic environment to give others the chance to see more of the beauty in the natural sciences and look with awe to the Creator.

Transitions in the Outworkings of Love through an Academic Career

The second part of Hutchinson's article moves to the outworking of love in the interpersonal relationships that are woven through scientific work and are particularly central in a team working together on a large research project. Hutchinson identifies particularly the temptations of the 'arrogance of the expert' and 'excessive competitiveness' and the challenges of humility and servant leadership. These are all key issues for any Christian working in the natural sciences.

Hutchinson also observes that there will be subtle changes in human relationships and hence the outworkings of love through an academic research career. As an initial research student working in a large research team, expressions of love may include: graciously choosing to adapt one's way of working to the needs of the larger project; accepting the time limitations of the Principal Investigator even when you don't get all the meeting time you would like with them; and, on occasions, offering to help a colleague with an unusually high work load even when the work would have no benefit to your own research.

For those academics moving into supervisory and leadership positions, either as postdocs or research team leaders, love can be expressed, for example, through being with and listening to an underperforming team member who others might dismiss only as a problem to be solved, when reviewing a manuscript where you need to give critical feedback writing it in a way that prompts the authors to do better rather than leaving them feeling defeated, or taking time to give a collaborator advice in an area which is not connected to your joint research but where you have expertise.

For senior scholars there may be invitations to sit on committees that allocate grants or award prizes or other honours or occasions to take the lead in shaping the direction of growth of a research field or to contribute to the development of government scientific policy. These activities clearly give increasing

opportunities for expressions of love. As O'Donovan notes, we need to be those who are continually alert to discern the way of love in each individual situation, as much in the academy as in all of life. I hope these simple illustrations may stimulate us all to move more fully in the way of love.

[1] R. Wain, C. Redfield, S.J. Ferguson and L.J. Smith 'NMR analysis shows that a *b*-type variant of *Hydrogenobacter thermophilus* cytochrome c_{552} retains its native structure.' *J. Biol. Chem.* **279,** 15177-15182 (2004); L.J. Smith, A. Kahraman and J. M. Thornton 'Heme proteins - diversity in structural characteristics, function and folding.' *Proteins: Structure, Function and Bioinformatics* **78**, 2349-2368 (2010)

For more information

www.globalfacultyinitiative.net