

# Rory M. Hadden

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## Education

2007–2011 **PhD in Fire Safety Engineering**, BRE Centre for Fire Safety Engineering, University of Edinburgh.

Thesis Smouldering and self-sustaining reactions in solids: an experimental approach  
Available here: <http://hdl.handle.net/1842/5587>

Supervisors Dr Guillermo Rein and Professor José L. Torero

An experimental and theoretical investigation into the behaviour of reactive solid materials. Project involves the ignition dynamics of polyurethane foams, emissions from subsurface peat fires, the suppression of subsurface coal fires and reactions in non-carbon-based energetic materials. My research is focused on providing engineering solutions to fire safety related problems. I have gained experience using small and large scale calorimetry apparatus as well as specialized computational tools.

Aug–Nov 2009 **Visiting Research Scholar**, University of California, Berkeley.

Devised and undertook experiments to investigate the propensity of firebrands to ignite wildfires.

Supervisor Professor A. Carlos Fernandez-Pello

2003–2007 **MEng Chemical Engineering, 1<sup>st</sup> Class**, University of Edinburgh.

Thesis Investigation of fluid flow in microchannels

Supervisor Dr John R. E. Christy

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## Research Output

Publication record includes 3 international, peer-reviewed journal papers with a further 1 paper submitted and 2 in preparation (expected submission Aug 2011), 1 book chapter, 5 international conference communications and 4 poster presentations.

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## Professional Career

2007–2011 **Consultant**, *International Fire Investigators and Consultants Ltd.*

During the course of my PhD I have led and been involved in many fire investigation projects for international, industrial clients. These have involved laboratory experiments, literature reviews and site visits.

2011 **Research Assistant**, *The University of Edinburgh.*

Collaboration with the School of Geoscience to understand the interaction between fire and the natural environment through deep time.

2007–2011 **Teaching Assistant**, *The University of Edinburgh*.

Teaching of undergraduate students in a range of subjects from general engineering to specialized chemical and fire safety engineering topics including practical laboratory work and co-supervision of Masters theses. I have taught Fire Dynamics Laboratory, Chemical Engineering Computing, Engineering 1, Chemical Engineering Laboratories and Chemical Engineering Separation Processes.

2006 **Vacation Placement**, *ExxonMobil*.

Developed a flare minimization strategy for a large oil refinery.

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## Scholarships and Awards

2010 **Travel scholarship**, *Royal Academy of Engineering*.

2009 **Institute of Physics Travel award**, *Institute of Physics*.

2008 **JM Lessells Travel Scholarship**, *Royal Society of Edinburgh*.

2008 **Best Poster – Audience Choice Award**, *9th Symposium of the International Association of Fire Safety Science, Karlsruhe*.

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## Journal Papers

Belcher, C. M., Yearsley, J., **Hadden, R. M.**, McElwain, J., Rein, G., Baseline intrinsic flammability of Earth's ecosystems estimated from paleoatmospheric oxygen over the past 350 million years, *Proceedings of the National Academy of Sciences*, doi:10.1073/pnas.1011974107

**Hadden, R. M.**, Rein, G., Small-scale experiments of self-sustaining decomposition of NPK fertilizer and application to events aboard the Ostedijk in 2007, *Journal of Hazardous Materials* (2010), doi:10.1016/j.jhazmat.2010.11.047

**Hadden, R. M.**, Scott, S., Lautenberger, C., Fernandez-Pello, A. C., Ignition of Combustible Fuel Beds by Hot Particles: an Experimental and Theoretical Study, *Fire Technology*, doi:10.1007/s10694-010-0181-x

**Hadden, R. M.**, Alkatib, A., Rein, G., Torero, J. L. 2010. Radiant Ignition of Polyurethane Foam: the Effect of Sample Size, *Fire Technology* (submitted)

**Hadden, R. M.**, Rein, G., Experimental investigation of smouldering dynamics of peat by controlling the burning conditions (in preparation)

**Hadden, R. M.**, Rein, G., Carbon emissions from smouldering peat fires under a wide range of controlled burning conditions (in preparation)

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## Book Chapters

**Hadden, R. M.** and Rein, G., Burning and Suppression of Smouldering Coal Fires, in: *Coal and Peat Fires A Global Perspective*, Volume 1, Chapter 18, Editors: Stracher, G. B., Sokol, E. V., and Prakash, A., Elsevier, 2010

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## Conference Papers

**Hadden, R. M.**, Scott, S., Yun, A., Lautenberger, C., Fernandez-Pello, A. C., Ignition of Combustible Fuel Beds by Hot Metal Particles, *International Congress Combustion and Fire Dynamics*, Santander, October 2010

**Hadden, R. M.**, Rein, G., Ignition, suppression and CO/CO<sub>2</sub> emissions of subsurface coal fires at laboratory scale, *Second International Conference on Coal Fire Research*, Berlin, May 2010

**Hadden, R. M.**, Alkatib, A., Rein, G., Torero, J. L., Radiant Ignition of Smouldering Combustion in Polyurethane Foam: The Effect of Sample Size, Proceedings of the 6th International Seminar on Fire and Explosion Hazards, Leeds, Apr. 2010.

**Hadden, R. M.**, Rein, G., Ignition and Suppression of Smouldering Coal Fires in Small-scale Experiments, Fall meeting of the Western States Section of The Combustion Institute, Oct. 2009, Irvine.

**Hadden, R. M.**, Rein, G., Small scale extinguishing experiments of coal subsurface fires, 6th Mediterranean Combustion Symposium, Ajaccio, Jun. 2009

**Hadden, R. M.**, Jervis, F. and Rein, G., Investigation of the Fertilizer Fire aboard the Ostedijk, International Association of Fire Safety Science 9, Karlsruhe, Sept. 2008, doi:10.3801/IAFSS.FSS.9-1091

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## Posters

**Hadden, R. M.**, Rein, G., Ignition, suppression and CO/CO<sub>2</sub> emissions of subsurface coal fires at laboratory scale, Geophysical Research Abstracts 12, European Geoscience Union, Annual Meeting, Vienna, May 2010

Belcher, C. M., **Hadden, R. M.**, McElwain, J. C., Rein, G., Fuelling the palaeoatmospheric oxygen debate: how much atmospheric oxygen is required for ignition and propagation of smouldering fires?, Geophysical Research Abstracts 12, European Geoscience Union, Annual Meeting, Vienna, May 2010

Rein, G., **Hadden, R. M.**, Smouldering Subsurface Fires in the Earth System, Geophysical Research Abstracts 12, European Geoscience Union, Annual Meeting, Vienna, May 2010

**Hadden, R. M.**, Rein, G., Fire Fighting Coal Mine Fires: Characterization and extinguishing methods using small-scale Experiments, Poster, 9th Symposium of the International Association of Fire Safety Science, Karlsruhe.

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## Professional Affiliations

International Association of Fire Safety Science

Combustion Institute

Institute of Chemical Engineers

Institute of Physics

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## Additional Experience

Reviewer Fire Safety Journal, Fire Technology, Fire Safety Science