

Curriculum Vitae

Georgios Kyriakou

Associate Professor

Department of Chemical Engineering

University of Patras

PERSONAL INFORMATION

Department of Chemical Engineering
University of Patras
Caratheodori 1
GR 265 04
Patras
Greece.

Date of Birth: 07 April 1978
Nationalities: Greek / British

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EDUCATION

BSc in Chemistry (2000), University of Hull, United Kingdom, *First Class Honours* Degree.

PhD in Physical Chemistry (2004), University of Cambridge, United Kingdom.
Thesis title: Catalytic studies on Cu-based model and dispersed catalysts.
Supervisor: Professor Richard Lambert

PGCert - Postgraduate Certificate in Academic Practice (2014) University of Hull.

EMPLOYMENT HISTORY

February 2019 - current: **Associate Professor**, Department of Chemical Engineering, University of Patras, Caratheodory 1, GR 265 04, Patras, Greece

August 2018 – February 2019: **Reader in Nanomaterials**, European Bioenergy Research Institute and Chemical Engineering and Applied Chemistry, Aston University, B20 2RB, Birmingham, United Kingdom

September 2015 – August 2018: **Senior Lecturer in Nanomaterials**, European Bioenergy Research Institute and Chemical Engineering and Applied Chemistry, Aston University, B20 2RB, Birmingham, United Kingdom

August 2012 – August 2015: **Lecturer in Inorganic Nanomaterials**. Department of Chemistry, University of Hull, Hull, HU6 7RX, United Kingdom

January 2011 – July 2012: **Research Assistant Professor**. Research groups of Professor Charles Sykes and Professor Maria Flytzani-Stephanopoulos. Department of Chemistry, Pearson Chemistry Laboratory, 62 Talbot Avenue, Tufts University, Medford, Massachusetts, 02155, USA.

September 2010 – December 2010: **Senior Scientist**. Materials Science Institute, CSIC-University of Seville, Avda. Américo Vespucio 49, 41092 Seville, Spain.

September 2008 – December 2010: **Post Doctoral Research Associate**. Department of Chemistry, University of Cambridge, Lensfield Road, CB2 1EW, United Kingdom.
Sponsor: UK Engineering and Physical Sciences Research Council.

6 November 2007 - 6 May 2008: **Military services** – Greece

February 2004 – September 2007: **Post Doctoral Research Associate**. Department of Chemistry, University of Cambridge, Lensfield Road, CB2 1EW, United Kingdom.
Sponsor: BOC Edwards.

FUNDING / AWARDS

1. 2000-2003 Engineering and Physical Sciences Research Council funding
2. 2001-2003 Cambridge European Trust award
3. 2001-2003 King's College Scholarship
4. 2004-2007 BOC Edwards Industrial Post Doctoral research funding
5. 2008-2010 Engineering and Physical Sciences Research Council funding
6. 2011-2012 Tufts Collaborates Seed Grant (PI) - \$ 50,000
7. 2012-2015 National Science foundation funding - Award no: CBET-1159882 (GK Co-I) – \$ 349,999 (PI- Professor Maria Flytzani-Stephanopoulos, Co-I Professor Charles Sykes).
8. 2013-2016 Hull University Internal PhD Studentship (PI) - £ 42,000.
9. 2014 -2015 Royal Society Starting grant “Heterogeneously catalyzed hydrogenations for bio-based energy and fine chemicals” (PI)- £14,994.
10. 2014 Royal Society of Chemistry Small research grants: International scholarly visit by a member to a research institution (PI) £ 1500.
11. 2014 – 2017 EPSRC Starting Grant EP/M005186/1: Highly selective active sites in heterogeneous catalysis; (PI) £85,15
12. 2017-2019: BBSRC Cascade processes for integrated bio-refining of agricultural waste in India and Vietnam (Co-I) £607,148.
13. 2019-2022: C. Caratheodori program – Research committee university of Patras (PI) €30,000.
14. 2005 – 2019: Participated 5 times as a PI (Aston University) and 8 times as a Co-I in synchrotron beamtimes at Diamond (UK), Elettra (Italy), ESRF (France).
 - 14/12/2018 Ultra dispersed Cu nanoparticles Diamond B18 (PI)
(SP19850-1) for the hydrogenation of biomass platform chemicals. UK Catalysis Hub: (BAG)
 - 29/11/2017 NAP XPS investigation of furfural Diamond B07-C (PI)
(SI18173-1) hydrogenation over Pt(111)
 - 17/02/2016 NAP XPS investigation of furfural Dimond I09-2 (PI)
(SI12659-1) hydrogenation over Pt(111)
 - 12/02/2016 Structure, electronic properties and Diamond B18 (PI)
(SP12542-1) reactivity of well defined Au/Pd and Ag/Pd and nanoparticle catalysts for the selective catalytic reduction of NOx by H2 in the presence of oxygen
 - 13/11/2014 Gold-based bimetallic catalysts for Diamond B18 (PI)
(SP9577-2) the selective reduction of NO with CO and propene
 - 25/09/2013 Gold based Bimetallics: Low-Cost ESRF XAS (Co-I)
(CH-3947)

- Catalysts for selective oxidations
- 05/07/2013 (SP8688-1) Sustainable chemicals production: elucidating the active site and role of Na promotion in Au /hydrotalcite catalysed HMF selective oxidation Diamond B18 (Co-I)
 - 22/04/2013 (20125028) New directions in organic synthesis: mechanism and selectivity in the silver-catalyzed Sonogashira cross-coupling of chlorobenzene and phenylacetylene Elettra SUPERESCA (Co-I)
 - 01/03/2013 (20125104) Sustainable chemicals production: elucidating the active site and role of Na promotion in Au /hydrotalcite catalysed HMF selective oxidation Elettra XAFS (Co-I)
 - 24/04/2009 (20085084) New directions in the catalytic chemistry of gold: mechanism of Sonogashira coupling for the formation of carbon-carbon bonds Elettra SUPERESCA (Co-I)
 - 07/08/2007 (2007103) Four legs good, two legs better? One leg, two legs, three legs and four legs: surface-tethered manganese porphyrins as ultra-selective oxidation catalysts Elettra SUPERESCA (Co-I)
 - 01/02/2007 (2006102) Surface-tethered metalloporphyrins as catalysts and as chemically switchable molecular rotors Elettra VUV (Co-I)
 - 11/10/2005 (2005034) Extreme uv light-induced decomposition of adsorbed organics on Ru (0001): towards the implementation of next-generation photolithography Elettra VUV (Co-I)

MEMEBRSHIPS/FELLOWSHIPS

- Fellow of the Higher Education Academy (FHEA)
- Member of the Royal Society of Chemistry (MRSC)
- Member of the Association of Greek Chemists
- Member of the American Chemical Society

OTHER ACTIVITIES

- Guest Editor with Professor Christopher Baddeley for Surface Science, Volume 646, April 2016, Surface science for heterogeneous catalysis, a special issue in Honour of Richard Lambert.

- Proposal reviewer for the Centre of Functional Nanomaterials, Brookhaven National Laboratory, USA (2013- 2015).
- Grant proposal Reviewer for the Hellenic Foundation for Research and Innovation- H.F.R.I (ELIDEK)
- Grant proposal reviewer for the Engineering and Physical Science Research Council (EPSRC)
- Regular referee for scientific journals:
 - *Surface science; Chemical Science; ACS NANO; Accounts of Chemical Research; The Journal of Physical Chemistry C; The Journal of Physical Chemistry Letters; Applied catalysis B, Environmental; Applied Catalysis A: General; International Journal of Hydrogen Energy, Catalysis Today, ACS Sustainable Chemistry & Engineering*
 - Reviewer certificate of appreciation ACS publications -2011
 - Surface science highly valued reviewer certificate – 2014
 - Reviewer certificate of recognition - 2018
- Academic representative for Aston University for the Energy Research Accelerator Doctoral Training Partnership – Midlands UK (2016-2018).
- Aston representative for the Royal Society of Chemistry (RSC). Post included organising RSC promotional visits and invited lectures (2017-2019)
- Departmental seminar organiser, Department of Chemistry, University of Hull (2012 - 2015)
- Hull University local organiser for the RSC awards and prizes lectures (2013 – 2015)
- Member of the Chemical Engineering and Applied chemistry Health and Safety committee (Aston University, 2016 -2019)
- Member of the European Bioenergy Research Institute’s Health and Safety committee (Aston University 2016- 2019)
- European Bioenergy Research Institute’s representative for REF2021
- Participation in the European Bioenergy Research Institute’s managements group (2016-2019)

COLLABORATIONS WITH INDUSTRY

BOC EDWARDS Ltd., 2004-2007 (with Professor R.M. Lambert, University of Cambridge)

1. Development of solid state electrochemical hydrocarbon detection systems.
2. Contamination control of multilayer mirror optics intended for Extreme Ultra Violet Lithography.
3. Emission control and gas separation for advanced optical lithography tools.
4. Electrochemical gas traps.
5. Membrane based gas separation at sub-atmospheric pressures.
6. Design and operation of plasma reactors of process control and emission abatement.

TOYOTA, 2009-2010 (with Dr. A.E. H. Wheatley, University of Cambridge).

1. Synthesis of bimetallic nanoparticles for automotive applications.
2. Catalytic tests for NOx reduction.

TECHNICAL EXPERTISE / LABS

Ultra high vacuum surface science: X-Ray Photoelectron Spectroscopy, Mass Spectrometry, Temperature Programmed Reaction, Low Energy Electron Diffraction, Auger Electron Spectroscopy, Scanning tunnelling microscopy.

Catalysis, micro-reactors and analysis: Gas phase plug flow reactors, High pressure autoclave reactors, Liquid phase reactor stations, Solid state and liquid phase electrochemical reactors. Analytical techniques: Analytical techniques: GC, GC-MS, IR, UV-Vis, Chem BET, porosimetry, TPD, TPO, TPR, DRIFTS, XRD, XPS, HR-TEM, EDX.

Synchrotron Radiation

1. Synchrotron Radiation facility Elettra, Italy
 Beam line: SUPERESCA (X-ray photoelectron spectroscopy and Near edge X-ray absorption fine structure)
 Beam line: VUV (UV and X-ray photoelectron spectroscopy)
 Beam line: EXAFS (Extended X-ray absorption fine structure)
2. Synchrotron Radiation facility Diamond, UK
 Beam line: B18 EXAFS
 Beam line: B07 ambient pressure XPS – NEXAFS
3. Synchrotron Radiation facility (ESRF), France
 Beam line: BM25 - Spline

TEACHING EXPERIENCE

LECTURING

1. *Department of Chemical Engineering and Applied Chemistry, Aston University, United Kingdom*
 - CH1105: States of Matter (Design and delivery of course on Thermodynamics); (1st year Chemistry and Chemical Engineering students)
 - CE3003: Design projects (3rd year Chemical Engineering students)
 - CE3112: Nanomaterials (Design and delivery of the course) (3rd - 4th year Chemistry and Chemical Engineering students)
 - CH3010: Catalysis (Design and delivery of the thermodynamics course (3rd - 4th year)
 - CH3011: Final year Chemistry projects (3rd year chemistry)
 - CH3117: Literature Chemistry projects (3rd year chemistry)
2. *Chemistry Department, The University of Hull, United Kingdom*
 - 06727: Topics in Inorganic and Materials Chemistry (Design and deliver course on photo-electron Spectroscopy) (4th year chemistry)
 - 06747: Advanced Topics in Nanotechnology (design and delivery course on surface characterization techniques) (4th year)
 - 06751/06750: Topics in Nanotechnology (design and delivery of course on Mesoporous solids) (3rd and 4th year)
 - 05510: 1st year synthesis and analysis labs
 - 06013/06524: 2nd year Inorganic chemistry workshops
 - 06776: BSc Chemistry research projects; 5 students 2013-2015 (3rd years)
 - 06770: Literature projects; 10 students 2013-2015 (3rd year)
3. *Chemistry Department, Tufts University, United States*

- Catalysis and Surface Science (4th year chemistry and chemical engineering students)

4. *Chemistry Department, Cambridge University, United Kingdom*

- Demonstrator, 1st year laboratories, Thermodynamics Kinetics.
- Tutoring for 1st year Natural Sciences undergraduate tutoring (King's College, Cambridge). Topics: (i) Thermodynamics (ii) Kinetics (iii) Periodicity of the elements (iv) Organic.

Postgraduate and Masters Supervision (PhD, MChem, MEng and MSc)

1. *Department of Chemical Engineering, University of Patras, Greece*

- Sotirios Tsatsos, PhD (2019 -) Selective transformation of biomass derived molecules on well-defined single crystal surfaces (co-supervision with Professors Spyros Ladas and Stella Kennou).

2. *Department of Chemical Engineering and Applied Chemistry, Aston University, United Kingdom*

- Martin Taylor, PhD (2013 - 2017) Selective hydrogenation of biomass derived molecules on bimetallic surfaces.
- Brunella Barbero, PhD (2016 – 2017).
- Constanza Cucuzzella , PhD (2017 -) Hierarchical porous materials for selective oxidation reactions.
- Thomas Bryant, PhD (2016 -) Spatially orthogonal catalysts
- Mohammed Islam, PhD (2017 -) Single atom alloy catalysts
- Antonio Manuel Rodriguez, **Erasmus** (2016) Oxidation of phenylalcohol on Pd based catalysts.

3. *The University of Hull; Chemistry Department*

- Mohammed Alotaibi, PhD (2013 - 2015) Selective catalysis on precious metal doped monolithic devices.
- Richard Kidson, MChem (2013-2014) Selective hydrogenation of biomass derived molecules on Pt(111).
- Rebecca Hills, MChem (2013-2014) Heterogeneously catalysed coupling reactions on Cu based dispersed catalysts
- Louis Ashton, (2013-2014) Heterogeneously catalysed coupling reactions on Au based dispersed catalysts
- Rory Megginson, MChem (2014-2015) Selective oxidation of cyclohexene using gold nanoparticles supported in silica monoliths
- Elis Davies, MChem (2014-2015) Size Effects of Gold Nanoparticles on Cross Coupling Catalysts
- Blaine Murray, MChem (2014-2015) Oxidation Effects in the Nano-Copper Catalysed Ullmann Condensation Reaction
- Dan Liu, MSc (2013-2014) The use of gold nano catalysts in selective oxidation catalysis.

PUBLICATIONS

A. PEER REVIEWED PUBLICATIONS

- A1 Comprehensive Experimental and Theoretical Study of the CO + NO Reaction Catalyzed by Au/Ni Nanoparticles
G. Kyriakou, A. M. Márquez, J. P. Holgado, M. J. Taylor, A. E.H. Wheatley, J. P Mehta, J. Fernández Sanz, S. K. Beaumont, R. M. Lambert
ACS Catalysis **2019**, 9, 4919–4929
- A2 Monometallic and bimetallic catalysts based on Pd, Cu and Ni for hydrogen transfer deoxygenation of a prototypical fatty acid to diesel range hydrocarbons
K. W.Cheah, M. J. Taylor, A. Osatiashtiani, S. K. Beaumont, D. J. Nowakowski, S. Yusup, A. V. Bridgwater, G. Kyriakou
Catalysis Today **2019**, in press. DOI: 10.1016/j.cattod.2019.03.017
- A3 The catalytic cracking of sterically challenging plastic feedstocks over high acid density Al-SBA-15 catalysts
J. Socci, A. Osatiashtiani, G. Kyriakou, T. Bridgwater
Applied Catalysis A: General. **2019**, 570, 218-227
- A4 Effect of support oxygen storage capacity on the catalytic performance of Rh nanoparticles for CO₂ reforming of methane
I. V. Yentekakis, G. Goula, M. Hatzisymeon, I. Betsi-Argyropoulou, G. Botzolaki, K. Kousi, D. I Kondarides, M. J. Taylor, C. M.A. Parlett, A. Osatiashtiani, G. Kyriakou, J. P. Holgado, R. M. Lambert
Applied Catalysis B: Environmental **2019**, 243, 490-501
- A5 In-situ hydrogen generation from 1,2,3,4-tetrahydronaphthalene for catalytic conversion of oleic acid to diesel fuel hydrocarbons: Parametric studies using Response Surface Methodology Approach
K. W. Cheah, S. Yusup, G. Kyriakou, M. Ameen, M. J. Taylor, D. J. Nowakowski, A. V. Bridgwater, Y. Uemura
International Journal of Hydrogen Energy **2019**, in press. DOI: 10.1016/j.ijhydene.2018.05.112
- A6 Lipase immobilised on silica monoliths as continuous-flow microreactors for triglyceride transesterification
M. Alotaibi, J. C. Manayil, G. M. Greenway, S. J. Haswell, S. M. Kelly, A. F. Lee, K. Wilson and G. Kyriakou
React. Chem. Eng. **2018**, 3, 68-74
- A7 Coalescence of Cluster Beam Generated Sub-2 nm Bare Au Nanoparticles and Analysis of Au Film Growth Parameters
E. Verrelli, I. Michelakaki, N. Boukos, G. Kyriakou and D. Tsoukalas
Annalen der Physik **2018**, 530, 1700256
- A8 Dual wavelength (ultraviolet and green) photodetectors using solution processed Zinc Oxide nanoparticles
M. A. Ibrahim, E. Verrelli, K. T. Lai, G. Kyriakou, A. F. Lee, M. A. Isaacs, F. Cheng and M. O'Neill.
ACS Applied Materials & Interfaces **2017**, 9, 36971–36979

- A9 Ir-Catalysed Nitrous oxide (N₂O) Decomposition: Effect of Ir Particle Size and Metal–Support Interactions
I. V. Yentekakis, G. Goula, S. Kampouri, I. Betsi-Argyropoulou, P. Panagiotopoulou, M. J. Taylor, G. Kyriakou and R. M. Lambert
Catalysis Letters **2018**, 148, 341–347
- A10 Catalytic Hydrogenation and Hydrodeoxygenation of Furfural Over Pt(111); a Model System for the Rational Design and Operation of Practical Biomass Conversion Catalysts
M. J. Taylor, L. Jiang, J. Reichert, A. C. Papageorgiou, S. K. Beaumont, K. Wilson, A. F. Lee, J. V. Barth, and G. Kyriakou
Journal of Physical Chemistry C **2017**, 121, 8490–8497
- A11 Critical Role of Oxygen in Silver-Catalyzed Glaser-Hay Coupling on Ag(100) in Vacuum and in Solution on Ag Particles
N. Orozco, G. Kyriakou, S. K. Beaumont, J. Fernandez Sanz, J. P. Holgado, M. J. Taylor, J. P. Espinós, A. M. Márquez, D. J. Watson, A. R. Gonzalez-Elipe, R. M. Lambert
ACS Catalysis **2017**, 7, 3113–3120
- A12 Support enhanced α -pinene isomerization over HPW/SBA-15
L. Frattini, M. A. Isaacs, C. M.A. Parlett, K. Wilson, G. Kyriakou, A. F. Lee
Applied Catalysis B: Environmental **2017**, 200, 10-18.
- A13 Stabilization of catalyst particles against sintering on oxide supports with high oxygen ion lability exemplified by Ir-catalyzed decomposition of N₂O
I.V. Yentekakis, G. Goula, P. Panagiotopoulou, S. Kampouri, M. J. Taylor, G. Kyriakou, R. M. Lambert
Applied Catalysis B: Environmental **2016**, 192, 357-364.
- A14 Selective oxidation of cyclohexene through gold functionalized silica monolith microreactors
M. T. Alotaibi, M. J. Taylor, D. Liu, S. K. Beaumont, G. Kyriakou
Surface Science **2016**, 646, 179-185
- A15 Highly selective hydrogenation of furfural over supported Pt nanoparticles under mild conditions
M. J. Taylor, L. J. Durndell, M. A. Isaacs, C. M.A. Parlett, K. Wilson, A. F. Lee, G. Kyriakou
Applied Catalysis B: Environmental **2016**, 180, 580-585
- A16 Solid base catalysed 5-HMF oxidation to 2,5-FDCA over Au/hydrotalcites: fact or fiction?”
L. Ardemani, G. Cibin, A. J. M. A. Isaacs, G. Kyriakou, G A. F. Lee, C. M. A. Parlett, K. Wilson
Chemical Science **2015**, 6, 4940-4945
- A17 Sonogashira Cross-Coupling and Homocoupling on a Silver Surface: Chlorobenzene and Phenylacetylene on Ag(100)
C. Sanchez-Sanchez, N. Orozco, J. P. Holgado, S. K. Beaumont, G. Kyriakou, David J. Watson, A. R. Gonzalez-Elipe, L. Feria, J. Fernández Sanz, R. M. Lambert
Journal of the American Chemical Society **2014**, 137, 940-947

- A18 Removal of Pb²⁺ and Cd²⁺ from aqueous solution using chars from pyrolysis and microwave-assisted hydrothermal carbonization of *Prosopis africana* shell
S.E. Elaigwu, V. Rocher, G. Kyriakou, G. M. Greenway
Journal of Industrial and Engineering Chemistry **2014**, 20, 3467-3473
- A19 Microwave-assisted hydrothermal synthesis of carbon monolith via a soft-template method using resorcinol and formaldehyde as carbon precursor and pluronic F127 as template
Sunday E. Elaigwu, Georgios Kyriakou, Timothy J. Prior, Gillian M. Greenway
Materials Letters **2014**, 123, 198-201
- A20 Significant Quantum Effects in Hydrogen Activation.
Georgios Kyriakou, Erlend R. M. Davidson, Guowen Peng, Luke T. Roling, Suyash Singh, Matthew B. Boucher, Matthew D. Marcinkowski, Manos Mavrikakis, Angelos Michaelides, E. Charles H. Sykes
ACS Nano **2014**, 8, 4827-2835
- A21 An Atomic Scale View of Methanol Reactivity at the Cu(111)/CuOx Interface
T. J. Lawton, G. Kyriakou, A. E. Baber and E. C. H. Sykes
ChemCatChem **2013**, 5, 2684-2690
- A22 Molecular-Scale Perspective of Water-Catalyzed Methanol Dehydrogenation to Formaldehyde
M. B. Boucher, M. D. Marcinkowski, M. L. Liriano, C. J. Murphy, E. A. Lewis, A. D. Jewell, M. F. G. Mattera, G. Kyriakou, M. Flytzani-Stephanopolous and E. C. H. Sykes
ACS Nano **2013**, 7, 6181-6187
- A23 Controlling the Spillover Pathway with the Molecular Cork Effect
M. D. Marcinkowski, A. D. Jewell, M. Stamatakis, M. B. Boucher, E. A. Lewis, C. J. Murphy, G. Kyriakou, E. C. H. Sykes
Nature Materials **2013**, 12, 523-528
- A24 Quantum Tunneling Enabled Self-Assembly of Hydrogen Atoms on Cu(111)
A. D. Jewell, G. Peng, M. F. G. Mattera, E. A. Lewis, C. J. Murphy, G. Kyriakou, M. Mavrikakis and E. C. H. Sykes
ACS Nano **2012**, 6, 10115-10121
- A25 Molecular-Scale Surface Chemistry of a Common Metal Nanoparticle Capping Agent: Triphenylphosphine on Au(111)
A. D. Jewell, E. C. H. Sykes, and G. Kyriakou
ACS Nano **2012**, 6, 3545-3552
- A26 Isolated Metal Atom Geometries as a Strategy for Selective Heterogeneous Hydrogenations
G. Kyriakou, M. B. Boucher, A. D. Jewell, E. A. Lewis, T. J. Lawton, A. E. Baber, H. L. Tierney, M. Flytzani-Stephanopoulos, E. C. H. Sykes
Science **2012**, 335, 1209-1212
- A27 Rediscovering Cobalt's Surface Chemistry
E. A. Lewis, A. D. Jewell, G. Kyriakou, E. C. H. Sykes
Physical Chemistry and Chemical Physics **2012**, 14, 7215-7224

- A28 Controllable Restructuring of a Metal Substrate: Tuning the Surface Morphology of Gold
E.V. Iski, A. D. Jewell, H. L. Tierney, G. Kyriakou, E. C. H. Sykes
Surface Science **2012**, 606, 536-541
- A29 Organic thin film induced substrate restructuring: An STM study of the interaction of naphtho[2,3-a]pyrene Au(111) herringbone reconstruction
E.V. Iski, A. D. Jewell, H. L. Tierney, G. Kyriakou, E. C. H. Sykes
Journal of Vacuum Science and Technology A **2011**, 29, 04601
- A30 Aspects of heterogeneous enantioselective catalysis by metals
G. Kyriakou, S. K. Beaumont, R. M. Lambert
Langmuir **2011**, 27, 9687-9695
- A31 Sonogashira coupling catalyzed by gold nanoparticles: does homogeneous or heterogeneous chemistry dominate?
G. Kyriakou, S. K. Beaumont, S. M. Humphrey, C. Antonetti, R. M. Lambert
ChemCatChem **2010**, 2, 1444-1449
- A32 Synthesis, characterization and surface tethering of sulfide-functionalized Ti16-oxo-alkoxy cages
S. Eslava, A. C. Papageorgiou, S. K. Beaumont, G. Kyriakou, D. S. Wright, R. M. Lambert.
Chemistry of Materials **2010**, 22, 5174-5178
- A33 Identity of the Active Site in Gold Nanoparticle-Catalyzed Sonogashira Coupling of Phenylacetylene and Iodobenzene
S. K. Beaumont, G. Kyriakou, R. M. Lambert
Journal of the American Chemical Society **2010**, 132, 12246-12248
- A34 Influence of Adsorption Geometry in the Heterogeneous Enantioselective Catalytic Hydrogenation of a Prototypical Enone
S. K. Beaumont, G. Kyriakou, D. J. Watson, O. P.H. Vaughan, A. C. Papageorgiou, R. M. Lambert
Journal of Physical Chemistry C **2010**, 114, 15075-15077
- A35 Heterogeneous uptake of gaseous hydrogen peroxide by Gobi and Saharan dust aerosols: a potential missing sink for H₂O₂ in the troposphere
M. Pradhan, G. Kyriakou, A.T. Archibald, A. C. Papageorgiou, M. Kalberer, R. M. Lambert.
Atmospheric Chemistry and Physics **2010**, 10, 7127-7136
- A36 Sonogashira coupling on an extended gold surface in vacuo: reaction of phenylacetylene with iodobenzene on Au(111).
V. K. Kanuru, G. Kyriakou, S. K. Beaumont, A. C. Papageorgiou, D. J. Watson and R. M. Lambert
Journal of the American Chemical Society **2010**, 132, 8081-8086
- A37 Deprotection, Tethering, and Activation of a One-Legged Metalloporphyrin on a Chemically Active Metal Surface: NEXAFS, Synchrotron XPS, and STM Study of [SAC]P-Mn(III)Cl on Ag(100)
M. Turner, O. P. H. Vaughan, G. Kyriakou, D. J. Watson, L. Scherrer, A. C. Papageorgiou, J. K. Sanders, R. M. Lambert.
Journal of the American Chemical Society **2009**, 131, 14913-14919

- A38 Heterogeneously catalyzed asymmetric hydrogenation of C=C bonds directed by surface-tethered chiral modifiers
D. J. Watson, R. B. R. J. Jesudason, S. K. Beaumont, G. Kyriakou, J. W. Burton, R. M. Lambert
Journal of the American Chemical Society **2009**, 131, 14584
- A39 Principles of hydrocarbon detection in ultra high vacuum: optimizing sensitivity and selectivity towards harmful species
A.V. Stevens, G. Kyriakou, R.B. Grant, R.M. Lambert.
Sensors and Actuators B - Chemical **2009**, 136, 359-363
- A40 Deprotection, tethering and activation of a catalytically active porphyrin to a chemically active metal surface: [SAC]4P-Mn(III)Cl on Ag(100)
M. Turner, O. P. H. Vaughan, G. Kyriakou, D. J. Watson, L. Scherrer, G. Davidson, J. K. Sanders, R. M. Lambert.
Journal of the American Chemical Society **2009**, 131, 1910-1914
- A41 Amperometric / potentiometric hydrocarbon sensors: real world solutions for use in ultra high vacuum.
G. Kyriakou, A. V. Stevens, D. J. Davis, R. B. Grant, M. S. Tikhov and R. M. Lambert.
Journal of Applied Electrochemistry **2008**, 38: 1089
- A42 The molecular mechanism of tropospheric nitrous acid production on mineral dust surfaces
R. J. Gustafson, G. Kyriakou, R. M. Lambert.
ChemPhysChem **2008**, 9, 1390-1393
- A43 Toward the in situ remediation of carbon deposition on Ru capped multilayer mirrors intended for EUV Lithography: Exploiting the electron induced chemistry
D. J. Davis, G. Kyriakou, R. B. Grant, M. S. Tikhov, R. M. Lambert.
Journal of Physical Chemistry C **2007**, 111, 12165-12168
- A44 Electron impact-assisted carbon film growth on Ru(0001): implications for next generation EUV-lithography
G. Kyriakou, D. J. Davis, R. B. Grant, D. J. Watson, A. Keen, M. S. Tikhov, R. M. Lambert.
Journal of Physical Chemistry C **2007**, 111, 4491-4494
- A45 Quantitative hydrocarbon sensor for ultra high vacuum applications
D. J. Davis, G. Kyriakou, R. B. Grant, M. S. Tikhov, R. M. Lambert.
Journal of Physical Chemistry C **2007**, 111, 1491-1495
- A46 A novel, sensitive potentiometric hydrocarbon sensor for high vacuum applications
G. Kyriakou, D. J. Davis, R. B. Grant, M. S. Tikhov, A. Keen, P. Pakianathan, R. M. Lambert.
Journal of Physical Chemistry B **2006**, 110, 24571-24576
- A47 Tilt the molecule and change the chemistry: mechanism of S-promoted chemoselective catalytic hydrogenation of crotonaldehyde on Cu(111)
M. E. Chiu, D. J. Watson, G. Kyriakou, M. S. Tikhov, R. M. Lambert.
Angewandte Chemie International Edition **2006**, 45, 7530-7534

- A48 Uptake of n-hexane, 1-butene and toluene by Au/Pt bimetallic surfaces: a tool for selective sensing of hydrocarbons under high vacuum conditions
D. J. Davis, G. Kyriakou, R. M. Lambert.
Journal of Physical Chemistry B **2006**, 110, 11958-11961
- A49 Sensitivity and selectivity of Pt electrodes for hydrocarbon sensing in an ultra high vacuum environment
G. Kyriakou, D. J. Davis and R. M. Lambert.
Sensors and Actuators B-Chemical **2006**, 116, 1013-1018
- A50 Sulphur, normally a poison, strongly promotes chemoselective catalytic hydrogenation: stereochemistry and reactivity of crotonaldehyde on clean and S-modified Cu(111)
M. E. Chiu, G. Kyriakou, F. J. Williams, D. J. Watson, M. S. Tikhov, R. M. Lambert
Chemical Communications **2006**, 1283-1285
- A51 Copper as a selective catalyst for the epoxidation of propene
O. P. H. Vaughan, G. Kyriakou, N. MacLeod, M. S. Tikhov, R. M. Lambert
Journal of Catalysis **2005**, 236, 401-404
- A52 Acetylene coupling on Cu(111): formation of butadiene, benzene and cyclo-octatetraene
G. Kyriakou, J. Kim, M. S. Tikhov, N. Macleod, R. M. Lambert
Journal of Physical Chemistry B **2005**, 109, 10952-10956
- A53 Structure and dynamics of gold atomic chains grown on Cu(110): experiment and theory
G. Kyriakou, F. J. Williams, M. S. Tikhov, A. Wander, R.M. Lambert
Physical Review B **2005**, 72, 121408

B. PATENTS

- B1 Patent Number: WO2007144666-A1; TW200809426-A; EP2030083-A1; US2010043837-A1
Inventors: R. B. Grant, R. M. Lambert, D. J. Davis, G. Kyriakou
Title: Contamination control method for surface exposed to carbonaceous material and ionizing radiation involves supplying second gas containing reducing species such as carbon oxide for reacting with oxidizing species on material surface.
Publication Date: 21.12.2007
Patent Assignees: BOC GROUP PLC, CAMBRIDGE ENTERPRISE LTD, EDWARDS LTD

C. CONFERENCE PROCEEDINGS / ABSTRACTS / PRESENTATIONS:

- C1 The effect of Cu in PtCu bimetallic particles for the selective transformation of furfural (poster presentation and
Martin J. Taylor, Mohammed J. Islam, Thomas Bryant, Christopher Parlett, Mark Isaacs, Karen Wilson, Adam Lee and Georgios Kyriakou
Abstract and poster presentation
3rd – 5th January **2018**, UK Catalysis Conference 2018, Loughborough University, Loughborough, United Kingdom
- C2 The challenges for the characterisation of commercial anion exchange resins for catalysis
Manuela Schirru, Marta Granollers Mesa, Georgios Kyriakou
Abstract and poster presentation
27th -28th March **2018**, ChemEngDay UK 2018, University of Leeds, United Kingdom

- C3 Hydrogenation reactions of model alkenes and biomass derived molecules on Pt based catalysts, Pt(111) single crystals and single atom alloy catalysts
Georgios Kyriakou
Invited lecture
19 October **2017** Chemical Engineering, University of Patras, Greece
- C4 Triglyceride Transesterification over MgO doped Hierarchical Porous SiO₂
Thomas A. Bryant, Mark A. Isaacs, Christopher M.A. Parlett, Karen Wilson, Georgios Kyriakou and Adam F. Lee
Abstract and poster presentation
17 - 21 July **2017**, Royal Society of Chemistry, Catalysis: Fundamentals and Practice, Liverpool, United Kingdom
- C5 Ultra-selective hydrogenation of furfural on Pt based dispersed catalysts and extended Pt(111) single crystal surfaces
Georgios Kyriakou
Sponsors: Leverhulme - Royal Society Africa scheme.
International Workshop on Heterogeneous Catalysis, Nanomaterials, X-ray Techniques and NMR.
22 - 24 May **2017**, Chemistry Department, University of Ghana, Accra, Ghana
- C6 A surface science approach to heterogeneous catalysis
Georgios Kyriakou
Sponsors: Leverhulme - Royal Society Africa scheme.
Invited lecture
International Workshop on Heterogeneous Catalysis, Nanomaterials, X-ray Techniques and NMR
22 - 24 May **2017**, Chemistry Department, University of Ghana, Accra, Ghana
- C7 Ultra-selective hydrogenation of furfural on Pt based dispersed catalysts and extended Pt(111) single surfaces
G. Kyriakou, M. J. Taylor, K. Wilson and A. F. Lee
Oral presentation
4- 6 January **2017**, UK Catalysis Conference (UKCC), Holywell Park, Loughborough University, United Kingdom
- C8 Ultra-selective hydrogenation of furfural on Pt based dispersed catalysts and extended Pt(111) single surfaces”
Georgios Kyriakou
Invited talk
Global Bioenergy, Biofuels and Biorefining network (GB3 -Net)
2 December **2016**, Department of Chemical Engineering, University of Massachusetts, USA
- C9 Highly selective supported nanoparticles for the hydrogenation of furfural under mild conditions
Martin J. Taylor, Karen Wilson, Adam F. Lee and Georgios Kyriakou
Abstract and poster presentation
8 March **2016**, Perspectives On Applied Catalyst Characterization, Royal Society of Chemistry, Burlington House, London, United Kingdom

- C10 Highly selective supported nanoparticles for the hydrogenation of furfural under mild conditions
Martin J. Taylor, Karen Wilson, Adam F. Lee and Georgios Kyriakou
Abstract and poster presentation
3 - 8 July **2016**, 16th International Congress on Catalysis (ICC 16), China National Convention Centre, Beijing, China
- C11 Single atom alloys for selective catalytic hydrogenation reactions
Georgios Kyriakou, M. B. Boucher, F. R. Lucci, J. Liu, M. D. Marcinkowski, M. J. Taylor, M. Flytzani-Stephanopoulos and E. C. H. Sykes
Abstract and poster presentation
3 - 8 July **2016**, 16th International Congress on Catalysis (ICC 16), China National Convention Centre, Beijing, China
- C12 Heterogeneously catalysed cross coupling reactions on Gold; particles vs atomic dispersions
Georgios Kyriakou, Simon K. Beaumont, Adam F. Lee and Richard M. Lambert
Abstract and oral presentation
30 June – 2 July **2016**, The International Symposium on Single-Atom Catalysis (ISSAC), Dalian, China
- C13 Ir catalysed N₂O decomposition: Effect of Ir particle size and metal support interaction
I. V. Yentekakis, G. Goula, P. Panagiotopoulou, S. Kampouri, M. J. Taylor, G. Kyriakou and R. M. Lambert
Abstract
27 - 30 September **2016**, 5th International Conference on Industrial & Hazardous Waste Management, Chania, Crete, Greece
- C14 Optimising Pt Based Heterogeneous Catalysts for the Hydrogenation of Biomass Derived Molecules
M. J. Taylor, G. Kyriakou
Poster presentation
05 November **2015**, Challenges in Catalysis for Pharmaceuticals and Fine Chemicals IV, Bridlington house, London, United Kingdom
- C15 Pt-based heterogeneous catalysts for the selective hydrogenation of biomass based molecules
M. J. Taylor, G. Kyriakou
Poster presentation
09 April **2014**, Royal Society of Chemistry, Organic Division, North East Regional Meeting, University of Hull, United Kingdom
- C16 Nanostructured materials for renewable energy and chemical synthesis
G. Kyriakou
Invited lecture
22 October **2014**, Aston University, Birmingham, United Kingdom
- C17 Pt-based heterogeneous catalysts for the selective hydrogenation of biomass based molecules
M. Taylor, G. Kyriakou
Poster presentation
09 April **2014**, Royal Society of Chemistry, Organic Division, North East Regional Meeting, University of Hull, United Kingdom

- C18 Single Atom Alloy Catalysts for Selective Hydrogenation Reactions
M. Boucher, G. Kyriakou, G. Cladaras, B. Zugiz, J. Kammert, M. Marcinkowski, T. Lawton, E.C.H. Sykes, M. Flytzani-Stephanopoulos
Abstract and oral presentation
1-6 September **2013**, XIth European Congress on Catalysis, Lyon, France
- C19 Isolated metal atom geometries: A strategy for selective heterogeneous hydrogenations
G. Kyriakou, M. B. Boucher, A. D. Jewell, E. A. Lewis, T. J. Lawton, A. E. Baber, E.C.H. Sykes
Abstract and oral presentation
243rd ACS National Meeting, 25-29 March, 2012, San Diego, CA, USA
- C20 Towards a Molecular Level Understanding of CO and H₂ Adsorption and Dissociation on Cobalt Nanoparticles
E. A. Lewis, A.D. Jewell, G. Kyriakou, E.C.H. Sykes
Abstract and oral presentation
27 February – 2 March, **2012**, APS March Meeting 2012, Volume 57, Number 1, Boston, Massachusetts, USA
- C21 An atomic-scale study of the adsorption, assembly and reactivity of methanol with model Cu, O/Cu and Pd/Cu alloy surfaces with STM, TPD and XPS
T. J. Lawton, M. B. Boucher, G. Kyriakou and E. C. H. Sykes
Abstract and oral presentation
11 June **2012**, 86th ACS Colloid and Surface Science Symposium Baltimore, Maryland, USA
- C22 Atomic Scale Insights into the reactivity of catalytically important CuPd alloys
M.B. Boucher, T.J. Lawton, Jewell, M.D Marcinkowski, A. E. Baber, A. Lewis, H. Tierney, G. Kyriakou, M. Flytzani-Stephanopoulos, E.C.H. Sykes
Abstract and oral presentation
1-6 July **2012**, International Congress in Catalysis, 15th Annual ICC, Munich, Germany
- C23 An atomic-scale study of the reactivity of methanol with model Cu, O/Cu and Pd/Cu catalysts via STM, XPS and TPR
T. J. Lawton, M. B. Boucher, A. E. Baber, G. Kyriakou and E. C. H. Sykes
Poster Presentation
17 March **2012**, 2nd Annual NanoWorcester, Conference, Worcester, MA, USA
- C24 An STM and XPS investigation of the interaction of methanol with bare and oxidized Cu(111) model catalysts
T. J. Lawton, G. Kyriakou, A. E. Baber and E. C. H. Sykes
Abstract to the New England Chapter of the American Vacuum Society
6 June **2011**, Burlington, MA, USA
- C25 Heterogeneous asymmetric C=C hydrogenation: Critical influence of the hydrogenation substrate
S. K. Beaumont, G. Kyriakou, D. J. Watson, R. B. Jesudason, O. P. Vaughan, A. Papageorgiou, J. W. Burton, R. M. Lambert
Abstract and oral presentation
22-26 August **2010**, 240th ACS National Meeting, Boston, MA, USA

- C26 Heterogeneously-catalyzed C-C and C-N bond forming reactions on Au(111) and gold catalysts
G. Kyriakou, S. K. Beaumont, V. K. Kanuru, A. C. Papageorgiou, D. J. Watson, S. M. Humphrey, R. M. Lambert
Abstract and oral presentation
22-26 August **2010**, 240th ACS Meeting, Boston, MA, USA
- C27 Synthesis, characterization and Au surface tethering of Ti16-oxo-alkoxy cages
S. Eslava, A. C. Papageorgiou, S. K. Beaumont, G. Kyriakou, D. S. Wright, R. M. Lambert.
Abstract
22-26 August **2010**, Fundamental Research in Colloid and Surface Science, 240th ACS National Meeting, Boston, MA, USA
- C28 Heterogeneously-catalyzed Sonogashira coupling of phenylacetylene and iodobenzene on gold nanoparticles and Au(111)
G. Kyriakou, S. K. Beaumont, V. K. Kanuru, A. C. Papageorgiou, D. J. Watson, S. M. Humphrey and R. M. Lambert
Abstract and oral presentation
Gabor A. Somorjai Award for Creative Research in Catalysis: Symposium in Honor of Robert J. Madix
21 - 25 March **2010**, ACS 239th National Meeting, San Francisco, CA, USA
- C29 Heterogeneous asymmetric C=C hydrogenation: Enantiodirection by surface tethered chiral modifiers
S. K. Beaumont, G. Kyriakou, D. J. Watson, R. J. Bennie Ram John Jesudason, O. P.H. Vaughan, A. C. Papageorgiou, J. W. Burton, R. M. Lambert
Abstract and poster presentation
March 21 - 25, **2010**, ACS 239th National Meeting, San Francisco, CA, USA
- C30 Gold nanoparticles from by seed-growth method: control of size and shape
C. Antonetti, S. M. Humphrey, S. K. Beaumont, G. Kyriakou, R. M. Lambert
Abstract and poster presentation
31 August – 4 September, **2009**, IXth European Congress on Catalysis, Europacat, Europacat, Salamanca, Spain
- C31 Enabling Extreme Ultra Violet Lithography; Real world solutions in Ultra High Vacuum
G. Kyriakou, D. J. Davis, A. V. Stevens, R. B. Grant, A. Keen, M. S. Tikhov, R. M. Lambert
Invited talk
1 – 5 September **2007**, 1st International Conference Electrochemical Promotion of Catalysis, Thessaloniki, Greece
- C32 Amperometric and potentiometric platinum/YSZ electrochemical hydrocarbon sensors for high vacuum applications
G. Kyriakou, D. J. Davis, A. V. Stevens, R. B. Grant, A. Keen, M. S. Tikhov, R. M. Lambert
Abstract and poster presentation
26 – 31 August, **2007**, VIII European Congress on Catalysis, EuropaCat, Turku, Finland
- C33 Understanding chemoselective heterogeneous catalysis
M. E. Chiu, D. J. Watson, G. Kyriakou, F.J. Williams, M. S. Tikhov, R. M. Lambert
Abstract and oral presentation
10-14 September **2006**, ACS 232nd National Meeting, San Francisco, CA, USA

- C34 Contamination Control in the projection Optics Environment
A. Keen, R. B. Grant, R. M. Lambert, M. S. Tikhov, G. Kyriakou, D. J. Davis
Abstract and poster presentation
15 – 18 October **2006**, 5th International EUVL Symposium, Barcelona, Spain
- C35 Contamination Sensing and Control for Multilayer Optics
A. Keen, R. B. Grant, G. Kyriakou, D. J. Davis, R. M. Lambert
Abstract and poster presentation
7- 9 November **2005**, 4th International EUVL Symposium, San Diego, USA
- C36 Part per trillion (10⁻⁹ mbar) sensor for trace determination of organic contamination in vacuum environments
R. B. Grant, F. Tapp, P. Pakianathan, R. M. Lambert, D. J. Davis and G. Kyriakou.
Abstract and poster presentation
1-4 November **2004**, 3rd International EUVL symposium, Miyazaki, Japan
- C37 Alkene Selective oxidation on Cu/Au surfaces
G. Kyriakou, F. J Williams, M. S. Tikhov, R. M. Lambert
Abstract and poster presentation
1 – 6 June **2003**, 18th North American Catalysis Society Meeting, Cancun, Mexico
- C38 Chemistry and Catalysis on Cu and Cu/Au Bimetallic Surfaces
G. Kyriakou
Oral presentation
Departmental Colloquia in Physical Chemistry,
11 February **2003**, Department of Chemistry, University of Cambridge, Cambridge, United Kingdom
- C39 The Selective Oxidation of Styrene on Au/Cu(111)bimetallic surfaces
G. Kyriakou, M. S. Tikhov, R. M. Lambert
Poster Presentation
4-9 August **2002**, UK Surface Science Summer School, Department of Physics, University of Warwick, United Kingdom.