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Research interests

Nanophysics, Materials Physics, Biomaterials, Hard-Soft-Matter interfaces

Employment

Lecturer

Lecturer
Physics
University of York
Heslington, York
1 Oct 2007 → 30 Sept 2013

Reader

Reader
Physics
University of York
Heslington, York
1 Oct 2013 → 30 Sept 2019

Professor

Professor
Physics
University of York
Heslington, York
1 Oct 2019 → present

Research outputs

Incisional Hernia Development: Wound Healing Gone Wrong?

Abbas, A. A., Gunning, P., Chintapatla, S. & Kröger, R., 5 Mar 2026, In: Wound Repair and Regeneration. 34, 2, 15 p., e70131.

Aragonite lithium/magnesium as an indicator of calcification media saturation state in marine calcifiers

Castillo Alvarez, C., Hathorne, E., Clog, M., Finch, A., Kröger, R., Penkman, K. & Allison, N., 28 Nov 2025, In: Communications Earth and Environment. 6, 1, 9 p., 984.

Dynamics of intrafibrillar collagen mineralization revealed by multimodal in situ analysis

Kröger, R., Tong, E., Gower, L., Smith, A. J. & Parker, J. E., 27 Oct 2025, (Accepted/In press) In: Acta Biomaterialia.

Connecting length scales: general discussion

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Crystal nucleation in biominerals: general discussion

Ayre, O., Azaïs, T., Barbosa, N., Bertinetti, L., Birkedal, H., Chamard, V., Chevrier, D. M., Christensen, T. E. K., Dauphin, Y., Dean, M. N., Deering, J., Demichelis, R., Duer, M., Elbaum, M., Gonnah, R., Gower, L., Grünewald, T. A., Houben, L., Hsu, Y.-L. & Kröger, R. & 13 others, Marin, F., McKee, M. D., Nudelman, F., Parker, J. E., Penkman, K., Perez-Huerta, A., Rez, P., Reznikov, N., Rodriguez-Palomo, A., Rossi, A., Schemenz, V., Triccas, A. & Wingender, B., 1 Sept 2025, In: FARADAY DISCUSSIONS. 261, p. 166-191

Interfaces at the micron scale: general discussion

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Interfaces at the nano scale: general discussion

Ayre, O., Azaïs, T., Barbosa, N., Birkedal, H., Ceseri, S., Chamard, V., Chandra Rajan, K., Chevrier, D. M., Christensen, T. E. K., D'Alba, L., Dauphin, Y., Deering, J., Demichelis, R., Duboisset, J., Duer, M., Elbaum, M., Gonnah, R., Gower, L., Grünewald, T. A. & Houben, L. & 12 others, Khurshid, B., Kröger, R., Marin, F., McKee, M. D., Nudelman, F., Parker, J. E., Rez, P., Reznikov, N., Rossi, A., Sauer, K., Schemenz, V. & Triccas, A., 1 Sept 2025, In: FARADAY DISCUSSIONS. 261, p. 312-339

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Investigating temperature influences on shell growth and microstructural variations in Bay scallops: Insights from multiscale microscopy

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The role of anisotropy for the defect properties in a-plane GaN - art. no. 689403

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Interfacial structure of a-plane GaN grown on r-plane sapphire

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Defect structure of a-plane GaN grown by hydride and metal-organic vapor phase epitaxy on r-plane sapphire

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Anisotropic spatial correlation of CdSe/Zn(S)Se quantum dot stacks grown by MBE

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Crack free monolithic nitride vertical-cavity surface-emitting laser structures and pillar microcavities

Lohmeyer, H., Sebald, K., Kruse, C., Kroeger, R., Gutowski, J., Hommel, D., Wiersig, J. & Jahnke, F., 2006, In: *Physica status solidi a-Applications and materials science*. 203, 7, p. 1749-1753 5 p.

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Paskova, T., Kroeger, R., Paskov, P. P., Figge, S., Hommel, D., Monemar, B., Haskell, B., Fini, P., Speck, J. S., Nakamura, S., Litton, C., Grote, J., Morkoc, H. & Madhukar, A., 2006, *Gallium Nitride Materials and Devices*. Vol. 6121. p. 12106 1 p.

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Structural analysis of pyramidal defects in Mg-doped GaN

Pretorius, A., Schowalter, A., Daneu, N., Kroeger, R., Recnik, A. & Rosenauer, A., 2006, *Physica Status Solidi C - Current Topics in Solid State Physics, Vol 3, No 6*. Hildebrandt, S. S. M. (ed.). Vol. 3. p. 1803-1806 4 p. (Physica Status Solidi C-Current Topics in Solid State Physics).

Surface segregation of Si and Mg dopants in MOVPE grown GaN films revealed by X-ray photoemission spectro-microscopy

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Investigation of InxGa1-xN islands with electron microscopy

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Room-temperature operation of a green monolithic II-VI vertical-cavity surface-emitting laser

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Compositional fluctuations in Al_xGa_{1-x}N layers grown on 6H-SiC (0001) by metal organic vapor phase epitaxy

Kroger, R., Einfeldt, S., Reitmeier, Z. J., Chierchia, R., Ryder, P., Hommel, D. & Davis, R. F., 2003, *Gan and Related Alloys-2002*. Wetzels, C. Y. E. T. S. J. S. A. Y. (ed.). Vol. 743. p. 255-260 6 p. (Materials Research Society Symposium Proceedings).

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Plasma induced microstructural, compositional, and resistivity changes in ultrathin chemical vapor deposited titanium nitride films

Kröger, R., Eizenberg, M., Marcadal, C. & Chen, L., Apr 2002, In: *Journal of Applied Physics*. 91, 8, p. 5149-5154 5 p.

Investigation of green emitting monolithic II-VI vertical cavity surface emitting laser

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On the way to the II-VI quantum dot VCSEL

Passow, T., Klude, M., Kruse, C., Leonardi, K., Kroger, R., Alexe, G., Sebald, K., Ulrich, S., Michler, P., Gutowski, J., Heinke, H. & Hommel, D., 2002, *Advances in Solid State Physics 42*. Kramer, B. (ed.). Vol. 42. p. 13-25 13 p. (Advances in Solid State Physics).

Optical gain of CdSe quantum dot stacks

Sebald, K., Michler, P., Gutowski, J., Kroger, R., Passow, T., Klude, M. & Hommel, D., 2002, In: *Physica status solidi a-Applied research*. 190, 2, p. 593-597 5 p.

Pyramidal defect formation in view of magnesium segregation

Figge, S., Kroger, R., Bottcher, T., Ryder, P. & Hommel, D., 2002, In: *Physica status solidi a-Applied research*. 192, 2, p. 456-460 5 p.

Realization of a GaN laser diode with wet etched facets

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Electrically pumped lasing from CdSe quantum dots

Klude, M., Passow, T., Kroger, R. & Hommel, D., 2001, In: Electronics Letters. 37, 18, p. 1119-1120 2 p.

Influence of diffusion barriers on the nucleation and growth of CVD Cu for interconnect applications

Kroger, R., Eizenberg, M., Cong, D., Yoshida, N., Chen, L. Y., Ramaswami, S. & Carl, D., 2000, In: Microelectronic Engineering. 50, 1-4, p. 375-381 7 p.

The role of kinetics in the nucleation and void formation in copper films produced by chemical vapor deposition

Kroger, R., Eizenberg, M., Rabkin, E., Cong, D. & Chen, L., 2000, In: Journal of Applied Physics. 88, 4, p. 1867-1872 6 p.

Nucleation and growth of CVD Cu films

Kroger, R., Eizenberg, M., Cong, D., Yoshida, N., Chen, L. Y. & Chen, L., 1999, *Advanced Interconnects and Contacts*. Edelstein, D. C. K. T. O. M. C. T. K. N. W. E. J. (ed.). Vol. 564. p. 237-241 5 p. (Materials Research Society Symposium Proceedings).

Properties of copper films prepared by chemical vapor deposition for advanced metallization of microelectronic devices

Kroger, R., Eizenberg, M., Cong, D., Yoshida, N., Chen, L. Y., Ramaswami, S. & Carl, D., 1999, In: Journal of the Electrochemical Society. 146, 9, p. 3248-3254 7 p.

Enhanced diamond film growth by hot-filament CVD using forced convection

Kroger, R., Schafer, L., Klages, C. P. & Six, R., 1996, In: Physica status solidi a-Applied research. 154, 1, p. 33-42 10 p.

MASS AND OPTICAL-EMISSION SPECTROSCOPY OF PLASMAS FOR DIAMOND-SYNTHESIS

Benndorf, C., Joeris, P. & Kroger, R., 1994, In: PURE AND APPLIED CHEMISTRY. 66, 6, p. 1195-1205 11 p.

INVESTIGATIONS CONCERNING THE ROLE OF HYDROGEN IN THE DEPOSITION OF DIAMOND FILMS

Joeris, P., Benndorf, C. & Kroger, R., 1993, In: Surface & coatings technology. 59, 1-3, p. 310-315 6 p.

Activities**McGill University**

KROGER, R. (Collaborator)
15 Sept 2025 → 30 May 2026

Faraday Discussion: Advanced Imaging in Biomineralisation Research

Kröger, R. (Chair) & Nudelman, F. (Chair)
14 May 2025 → 16 May 2025

Frontiers of Physical Imaging - Royal Microscopical Society

Kroeger, R. (Chair)
19 Nov 2024 → 20 Nov 2024

Nanoscale organization of bone

Kroger, R. (Invited speaker)
25 May 2024

Unraveling the nanoscale organisation of marine calcifiers using advanced microscopy and spectroscopy

Kroger, R. (Invited speaker)
22 May 2024

Studying collagen mineralization dynamics using in-situ Raman spectroscopy together with in-situ small and wide-angle X-ray scattering

Kroeger, R. (Speaker)
23 Oct 2023 → 25 Oct 2023

33rd Annual Conference of the European Society for Biomaterials
Kroger, R. (Keynote/plenary speaker)
4 Sept 2023

McGill Summer School 2023 - Electron Microscopy Techniques
Kroger, R. (Invited speaker)
5 Jun 2023 → 7 Jun 2023

Application of microscopy and spectroscopy for the interrogation of biominerals
Kroger, R. (Invited speaker)
21 Mar 2023

Ultrastructure and Composition of the Abdominal Wall
Kröger, R. (Keynote/plenary speaker)
1 Feb 2023 → 3 Feb 2023

Investigating the structure and formation dynamics of biomineralising systems
Kröger, R. (Invited speaker)
15 Dec 2022

Revealing the 3D structure and formation dynamics of biominerals using electrons, X-rays and photons
Kröger, R. (Invited speaker)
22 Jul 2022

University of Connecticut School of Medicine
Kröger, R. (Advisor)
27 Jun 2022 → 31 Jul 2027

Transmission Electron Microscopy using Liquid Cells
Kröger, R. (Invited speaker)
21 Jun 2022

Advanced electron microscopy and X-ray scattering techniques to study bone mineralisation
Kröger, R. (Invited speaker)
1 May 2022

McGill University
Kröger, R. (Advisor)
25 Apr 2022 → 27 Jul 2022

3D imaging and in situ studies of hierarchical biominerals
Kroger, R. (Keynote/plenary speaker)
26 Aug 2021

3D Analysis of the Bone Nanostructure
Kroger, R. (Invited speaker)
2021 → ...

Science Foundation of Ireland (SFI)
Kroger, R. (Reviewer)
2021

The Small Scale Matters: Using Electron Microscopy to Interrogate Biogenic Materials

Kroger, R. (Invited speaker)
6 Nov 2020

Nature (Journal)

Kroger, R. (Reviewer)
20 Jun 2020

ACS Nano (Journal)

Kroger, R. (Reviewer)
Jun 2020

ADVANCED FUNCTIONAL MATERIALS (Journal)

Kroger, R. (Reviewer)
2020 → ...

Royal Microscopical Society (External organisation)

Kroger, R. (Advisor)
2020 → ...

Sloan Foundation

Kroger, R. (Advisor)
2020

Understanding and Mimicking Biomineralisation

Kroger, R. (Invited speaker)
2020

International Conferences on the Chemistry and Biology of Mineralized Tissues

Kroger, R. (Member of programme committee)
20 Oct 2019 → ...

Microscience Microscopy 2019

Kröger, R. (Organiser)
1 Jul 2019 → 4 Jul 2019

The 53rd Annual Meeting of the Israel Society for Microscopy

Kroger, R. (Invited speaker)
29 May 2019

Acta Biomaterialia (Journal)

Kroger, R. (Reviewer)
2019 → ...

Nature (Journal)

Kroger, R. (Reviewer)
2019

Proceedings of the National Academy of Sciences of the United States of America (Journal)

Kroger, R. (Guest editor)
2019 → ...

On fractures, fractions and fractals: Insights into bone and collagen/apatite composites

Kroger, R. (Invited speaker)

14 Nov 2018

BPSI Summer Symposium 2018: Business as Usual? – Collaborative Research at the University-Business Interface

Kroger, R. (Organiser)

28 Jun 2018

Microscopy characterisation of organic-inorganic Interfaces

Kröger, R. (Invited speaker)

22 Feb 2018

Angewandte Chemie International Edition (Journal)

Kroger, R. (Reviewer)

2018

CRYSTAL GROWTH DESIGN (Journal)

Kroger, R. (Reviewer)

2018 → ...

Crystals (Journal)

Kröger, R. (Reviewer)

2018

CrystEngComm (Journal)

Kroger, R. (Reviewer)

2018 → ...

In situ microscopy workshop at CIC/Nanogune San Sebastian

Kroger, R. (Invited speaker)

2018 → ...

Journal of the Royal Society Interface (Journal)

Kroger, R. (Reviewer)

2018 → ...

Nano Letters (Journal)

Kroger, R. (Reviewer)

2018 → ...

Nature Communications (Journal)

Kroger, R. (Reviewer)

2018

Nature Materials (Journal)

Kroger, R. (Reviewer)

2018 → ...

PLoS ONE (Journal)

Kröger, R. (Reviewer)

2018

Proceedings of the National Academy of Sciences of the United States of America (Journal)

Kroger, R. (Reviewer)

2018 → ...

Royal Microscopical Society (External organisation)

Kroger, R. (Trustee)
2018 → ...

Scientific Reports (Journal)

Kroger, R. (Reviewer)
2018

Microscopy and Microspectroscopy of Nanomaterials in Liquids

Kroger, R. (Organiser)
18 Sept 2017

Specialized iNANO Lecture: Quantitative Investigation of Nanomaterials using Advanced Transmission Electron Microscopy

Kroger, R. (Invited speaker)
9 Aug 2017

Laurie Gower

Kroger, R. (Host)
15 Jun 2017 → 15 Jul 2017

International Conference on the Chemistry and Biology of Mineralized Tissue

Kroger, R. (Invited speaker)
29 May 2017 → 1 Jun 2017

12th Pacific Rim Conference on Ceramic and Glass Technology - Hawaii, US

Kroger, R. (Invited speaker)
21 May 2017 → 26 May 2017

Studying oxidation pathways and structure of Fe-based NPs with high-resolution TEM

Kroger, R. (Invited speaker)
19 Jan 2017

Acta Biomaterialia (Journal)

Kröger, R. (Reviewer)
2017

Chemistry of Materials (Journal)

Kröger, R. (Reviewer)
2017

CrystEngComm (Journal)

Kröger, R. (Reviewer)
2017 → ...

Journal of biomechanics (Journal)

Kroger, R. (Reviewer)
2017

McGill University: Anatomy and Cell Biology Departmental Seminar

Kröger, R. (Invited speaker)
2017

MMC17 -EMAG17 Manchester

Kröger, R. (Participant)
2017

Nature Communications (Journal)

Kroger, R. (Reviewer)
2017

Proceedings of the National Academy of Sciences of the United States of America (Journal)

Kroger, R. (Reviewer)
2017

Nanomaterials in Action

Kroger, R. (Invited speaker)
6 Oct 2016

In situ studies of biological and bio-inspired materials using electron microscopy in liquids - Presentation at the University of Münster/Germany

Kroger, R. (Invited speaker)
5 Sept 2016

Material Research Society Spring Meeting in Phoenix/Arizona

Kroger, R. (Invited speaker)
28 Mar 2016 → 1 Apr 2016

Israel Society of Microscopy Golden Jubilee Conference

Kroger, R. (Invited speaker)
2016 → ...

PhD Examination

Kroger, R. (Examiner (external))
2016

Scientific Reports (Journal)

Kroger, R. (Reviewer)
2016 → ...

The International Chemical Congress of the Pacific Basin Societies

Kroger, R. (Invited speaker)
15 Dec 2015 → 20 Dec 2015

The International Chemical Congress of the Pacific Basin Societies

Kroger, R. (Invited speaker)
15 Dec 2015 → 20 Dec 2015

ACCGE 20 (American Conference on Crystal Growth and Epitaxy) in Big Sky/Montana

Kroger, R. (Chair)
3 Aug 2015 → 7 Aug 2015

American Conference on Crystal Growth and Epitaxy (ACCGE-20)

Kroger, R. (Invited speaker)
3 Aug 2015 → 7 Aug 2015

International Workshop of the ARISTEIA Project COMANA Complex Magnetic Nanostructures

Kroger, R. (Invited speaker)

2 Jun 2015 → 5 Jun 2015

Analytical Chemistry (Journal)

Kroger, R. (Reviewer)

Mar 2015 → ...

ADVANCED FUNCTIONAL MATERIALS (Journal)

Kroger, R. (Reviewer)

1 Jan 2015 → ...

Royal Microscopy Society (External organisation)

Kroger, R. (Member)

1 Jan 2015 → ...

ACS Nano (Journal)

Kroger, R. (Reviewer)

2015 → ...

Advanced Materials (Journal)

Kroger, R. (Reviewer)

2015

ROYAL MICROSCOPICAL SOCIETY (External organisation)

Kroger, R. (Member)

2015 → ...

Nanomaterials Research using Electron Microscopy - University of Florida

Kroger, R. (Invited speaker)

9 Dec 2014

Materials Research Society Fall Meeting 2014

Kroger, R. (Organiser)

1 Dec 2014 → 5 Dec 2014

Microscience Microscopy Congress 2014

Kroger, R. (Organiser)

1 Jul 2014 → 3 Jul 2014

New approaches for the nanoscale study of processes in liquids by electron microscopy - MMC2014

Kroger, R. (Invited speaker)

1 Jul 2014 → 3 Jul 2014

E-MRS Spring Meeting 2014

Kroger, R. (Invited speaker)

26 May 2014 → 30 May 2014

Langmuir (Journal)

Kroger, R. (Reviewer)

2014 → ...

Nature Communications (Journal)

Kroger, R. (Reviewer)

2014 → ...

Electron Microscopy and Analysis Group (EMAG) Conference

Kroger, R. (Invited speaker)

3 Sept 2013 → 6 Sept 2013

Electron Microscopy and Analysis Group (EMAG) Conference

Kroger, R. (Invited speaker)

3 Sept 2013 → 6 Sept 2013

Weizmann Institute of Science, Department of Structural Biology

Kroger, R. (Researcher)

5 Aug 2013 → 25 Aug 2013

Leeds EPSRC Nanoscience and Nanotechnology Facility (LENNF) re-launch event

Kroger, R. (Invited speaker)

25 Jun 2013

Studying mineral/organic composites with electron microscopy - Materials Science at the Physics/Biology interface

Kroger, R. (Invited speaker)

25 Jun 2013

Earth & Environmental Sciences Seminar - University of St. Andrews

Kroger, R. (Invited speaker)

23 Apr 2013

Journal of Crystal Growth (Journal)

Kroger, R. (Reviewer)

2013

Journal of Nanoparticle Research (Journal)

Kroger, R. (Reviewer)

2013 → ...

JOURNAL OF STRUCTURAL BIOLOGY (Journal)

Kroger, R. (Reviewer)

2013 → ...

Nanotechnology (Journal)

Kroger, R. (Reviewer)

2013

London Centre for Nanotechnology Seminar - Imperial College

Kroger, R. (Invited speaker)

6 Dec 2012

The 15th European Microscopy Congress

Kroger, R. (Organiser)

16 Sept 2012 → 21 Sept 2012

Microscopy and Microanalysis

Kroger, R. (Invited speaker)

29 Jul 2012 → 2 Aug 2012

Studying carbonate precipitation in-situ using electron microscopy

Kroger, R. (Invited speaker)
29 Jul 2012 → 2 Aug 2012

CECAM Workshop: Structure-Property Relationships in Hierarchical Biocomposites in Lausanne/Switzerland

Kroger, R. (Organiser)
16 Jul 2012 → 18 Jul 2012

CECAM workshop: Grand Challenges in Understanding Interfaces Between Hard and Soft Matter

Kroger, R. (Invited speaker)
11 May 2011 → 14 May 2011

JOURNAL OF STRUCTURAL BIOLOGY (Journal)

Kroger, R. (Reviewer)
2011 → ...

Structural characterization of the mineral phase and organic/mineral interfaces in the coral skeleton

Kroger, R. (Invited speaker)
29 Nov 2010 → 2 Dec 2010

Symposium NN: Biomineralization and Bioinspired Inorganic and Inorganic/Organic Materials - Materials Research Society Fall Meeting

Kroger, R. (Invited speaker)
29 Nov 2010 → 2 Dec 2010

Micron (Journal)

Kroger, R. (Reviewer)
2010 → ...

Symposium on Advanced Oxide Materials: 2nd UK-Taiwan International Networking for Young Scientists

Kroger, R. (Invited speaker)
9 Mar 2009 → 12 Mar 2009

University of Illinois at Urbana-Champaign

Kroger, R. (Visitor)
Aug 2007 → Jul 2008

Awards

Revealing the 3D nanoscale structure and composition of healthy and diseased bone and teeth

KROGER, R. (Principal investigator)
EPSRC: £42,298.40
1/04/22 → 31/07/22

Projects

Aberration-Corrected Scanning Transmission Electron Microscope with atomic resolution spectroscopy under controlled environmental conditions: AC-eSTEM

LAZAROV, V. (Principal investigator), BOYES, E. (Co-investigator), GAI, P. L. (Co-investigator), KROGER, R. (Co-investigator), TEAR, S. (Co-investigator) & YUAN, J. (Co-investigator)
EPSRC
1/11/19 → 30/04/26

MIB - Materials in Biology: Hard-Soft Matter Interfaces: From Understanding to Engineering

KROGER, R. (Principal investigator)

EPSRC
1/09/10 → 3/03/16

Mimicking and quantifying bone growth using X-ray spectroscopy and electron microscopy
KROGER, R. (Principal investigator) & Parker, J. (Principal investigator)
1/01/18 → 30/06/21

Nanoparticle interaction with proteins
KROGER, R. (Principal investigator)
1/01/18 → 31/08/27

Revealing the 3D nanoscale structure and composition of healthy and diseased bone and teeth
KROGER, R. (Principal investigator)
EPSRC
1/04/22 → 31/07/22

SMILEY: SMILEY: Smart Nano-structured Devices Hierarchically Assembled by Bio-mineralization Processes
KROGER, R. (Principal investigator)
EUROPEAN COMMISSION
1/12/12 → 30/11/15

The Control of Coral Biomineralisation
KROGER, R. (Principal investigator) & PENKMAN, K. E. H. (Co-investigator)
LEVERHULME TRUST
9/04/16 → 1/11/19

Understanding trace element and isotope partitioning in aragonites and calcites in biological environments
PENKMAN, K. E. H. (Principal investigator) & KROGER, R. (Co-investigator)
NATURAL ENVIRONMENT RESEARCH COUNCIL
18/03/19 → 18/09/23

URP 2019-20 (Strategic Capital) SEM-EDX: New Frontiers in Environmental and Heritage Science at York
LITTLE, A. P. (Principal investigator), KROGER, R. (Co-investigator), WHITE, M. J. (Co-investigator), BROWN, S. E. (Co-investigator), CRAIG, O. E. (Co-investigator), O'HIGGINS, P. (Co-investigator), PENKMAN, K. E. H. (Co-investigator), HODSON, M. E. (Co-investigator) & GEHRELS, R. (Co-investigator)
1/08/19 → 31/07/20

Wisdom Teeth: refining our understanding of human evolution through dating dental enamel
PENKMAN, K. E. H. (Principal investigator) & KROGER, R. (Co-investigator)
NATURAL ENVIRONMENT RESEARCH COUNCIL
1/08/19 → 31/12/23

OA: WUN-Ocean Acidification
KROGER, R. (Principal investigator)
6/02/14 → ...