1-2021

New Faculty Research Profile: Martin A. Edwards: Bibliometric Analysis of his Research

Lutishoor Salisbury

Yang Tian

Jeremy Smith

Profile of the Newest CHBC Faculty - Welcome!

Assistant Professor

Martin A. Edwards

Emphasis

- Scanned Probe Microscopy
- Biophysical phenomena
- Energy applications
- Electrochemistry

Research Program

In a highly interdisciplinary research program Edwards group aims to understand processes and manipulate objects at the micro- and nanoscale. The topics of investigation range from energy applications (batteries and fuel cells), nanobubbles and nanoparticles to biophysical phenomena.

Research Experience / Education

Research assistant professor, University of Utah	**2016-2020**
Senior research fellow, University of Utah	**2014-2016**
Post-doctoral, Univ. of North Carolina at Chapel Hill	**2011-2013**
Post-doctoral, IBEC, Barcelona, Spain	**2009-2011**
Ph.D., University of Warwick, UK	**2004-2008**
M.Sc., University of Warwick, UK	**2003-2004**
MMath, University of Warwick	**1999-2003**

Awards

- 2020. Society for Electroanalytical Chemistry. Royce W. Murray Young Investigator Award

Top 5 Cited Papers

Use the checkboxes to remove individual items from this Citation Report

or restrict to items published between 1945 and 2021 Go

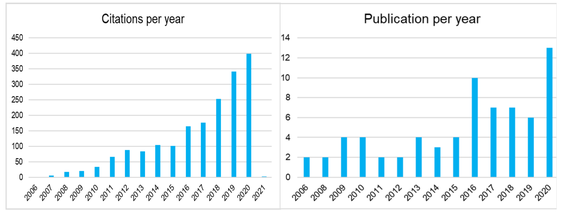
		Total	Average Citations per Year
1.	Localized High Resolution Electrochemistry and Multifunctional Imaging: Scanning Electrochemical Cell Microscopy By: Ebejer, Neil; Schnippering, Mathias; Colburn, Alexander W.; et al. ANALYTICAL CHEMISTRY Volume: 82 Issue: 22 Pages: 9141-9145 Published: NOV 15 2010	1872	124.80
2.	Scanning Micropipet Contact Method for High-Resolution Imaging of Electrode Surface Redox Activity By: Williams, Cara G.; Edwards, Martin A.; Colley, Anna L.; et al. ANALYTICAL CHEMISTRY Volume: 81 Issue: 7 Pages: 2486-2495 Published: APR 1 2009	141	11.75
3.	Observation of Multipeak Collision Behavior during the Electro-Oxidation of Single Ag Nanoparticles By: Oja, Stephen M.; Robinson, Donald A.; Vitti, Nicholas J.; et al. JOURNAL OF THE AMERICAN CHEMICAL SOCIETY Volume: 139 Issue: 2 Pages: 708-718 Published: JAN 18 2017	128	9.85
4.	Nanoscale Measurement of the Dielectric Constant of Supported Lipid Bilayers in Aqueous Solutions with Electrostatic Force Microscopy By: Gramse, G.; Dols-Perez, A.; Edwards, M. A.; et al. BIOPHYSICAL JOURNAL Volume: 104 Issue: 6 Pages: 1257-1262 Published: MAR 19 2013	86	17.20
5.	Voltage-Rectified Current and Fluid Flow in Conical Nanopores By: Lan, Wen-Jie; Edwards, Martin A.; Luo, Long; et al. ACCOUNTS OF CHEMICAL RESEARCH Volume: 49 Issue: 11 Pages: 2605-2613 Published: NOV 2016	84	9.33
		81	13.50

Journals and Impact (from ISI Journal Citation Reports)

JOURNAL TITLE	RECORDS	CATEGORY NAME	RANK / TOTAL JOURNALS	QUARTILE
ANALYTICAL CHEMISTRY	10	CHEMISTRY, ANALYTICAL	7 of 86	Q1
JOURNAL OF PHYSICAL CHEMISTRY C	9	CHEMISTRY, PHYSICAL	57 of 159	Q2
		MATERIALS SCIENCE, MULTIDISCIPLINARY	90 of 314	Q2
		NANOSCIENCE & NANOTECHNOLOGY	44 of 103	Q2
ACS NANO	6	CHEMISTRY, MULTIDISCIPLINARY	14 of 177	Q1
		CHEMISTRY, PHYSICAL	11 of 159	Q1
		MATERIALS SCIENCE, MULTIDISCIPLINARY	17 of 314	Q1
		NANOSCIENCE & NANOTECHNOLOGY	10 of 103	Q1
JOURNAL OF THE AMERICAN CHEMICAL SOCIETY	6	CHEMISTRY, MULTIDISCIPLINARY	13 of 177	Q1
LANGMUIR	4	CHEMISTRY, MULTIDISCIPLINARY	60 of 177	Q1
		CHEMISTRY, PHYSICAL	64 of 159	Q1
		MATERIALS SCIENCE, MULTIDISCIPLINARY	107 of 314	Q1
FARADAY DISCUSSIONS	3	CHEMISTRY, PHYSICAL	59 of 159	Q2
JOURNAL OF PHYSICAL CHEMISTRY LETTERS	3	CHEMISTRY, PHYSICAL	35 of 159	Q1
		MATERIALS SCIENCE, MULTIDISCIPLINARY	53 of 314	Q1
		NANOSCIENCE & NANOTECHNOLOGY	28 of 103	Q2
		PHYSICS, ATOMIC, MOLECULAR & CHEMICAL	3 of 37	Q1
APPLIED PHYSICS LETTERS	2	PHYSICS, APPLIED	37 of 155	Q1
CHEMELECTROCHEM	2	ELECTROCHEMISTRY	10 of 27	Q2
CHEMICAL SCIENCE	2	CHEMISTRY, MULTIDISCIPLINARY	21 of 177	Q1
CURRENT OPINION IN ELECTROCHEMISTRY	2	CHEMISTRY, PHYSICAL	43 of 159	Q2
		ELECTROCHEMISTRY	6 of 27	Q1
		MATERIALS SCIENCE, MULTIDISCIPLINARY	66 of 314	Q1
NANOTECHNOLOGY	2	MATERIALS SCIENCE, MULTIDISCIPLINARY	109 of 314	Q2
		NANOSCIENCE & NANOTECHNOLOGY	51 of 103	Q2
		PHYSICS, APPLIED	40 of 155	Q2
PHYSICAL CHEMISTRY CHEMICAL PHYSICS	2	CHEMISTRY, PHYSICAL	66 of 159	Q2
		PHYSICS & CHEMICAL	8 of 37	Q1
PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF	2	MULTIDISCIPLINARY SCIENCES	8 of 71	Q1
ACCOUNTS OF CHEMICAL RESEARCH	1	CHEMISTRY, MULTIDISCIPLINARY	7 of 177	Q1
ACS APPLIED ENERGY MATERIALS	1	CHEMISTRY, PHYSICAL	55 of 159	Q2
		ENERGY & FUELS	39 of 112	Q2
		MATERIALS SCIENCE, MULTIDISCIPLINARY	85 of 314	Q2
ACS SENSORS	1	CHEMISTRY, ANALYTICAL	3 of 86	Q1
		CHEMISTRY, MULTIDISCIPLINARY	27 of 177	Q1
		NANOSCIENCE & NANOTECHNOLOGY	24 of 103	Q1
ANALYST	1	CHEMISTRY, ANALYTICAL	15 of 86	Q1
ANGEWANDTE CHEMIE INTERNATIONAL EDITION	1	CHEMISTRY, MULTIDISCIPLINARY	15 of 177	Q1
NANO LETTERS	1	CHEMISTRY, MULTIDISCIPLINARY	19 of 177	Q1
		CHEMISTRY, PHYSICAL	18 of 159	Q1
		MATERIALS SCIENCE, MULTIDISCIPLINARY	25 of 314	Q1
BIOPHYSICAL JOURNAL	1	BIOPHYSICS	15 of 71	Q1
CHEMICAL COMMUNICATIONS	1	CHEMISTRY, MULTIDISCIPLINARY	34 of 177	Q1

Bibliometric Analysis of Prof. Edwards Research Profile

Citation Snapshot



h-index **26** Average citations per item **26.89**

Citing articles **1,296** Without self citations **1,242**

Sum of Times Cited **1,882** Without self citations **1,739**

Research Areas - Publications

Research Areas	Record Count	% of 70
CHEMISTRY	56	80
MATERIALS SCIENCE	30	42.857
SCIENCE TECHNOLOGY OTHER TOPICS	24	34.286
PHYSICS	11	15.714
ELECTROCHEMISTRY	7	10
BIOPHYSICS	2	2.857
BIOCHEMISTRY MOLECULAR BIOLOGY	1	1.429
ENERGY FUELS	1	1.429
ENGINEERING	1	1.429
NEUROSCIENCES NEUROLOGY	1	1.429
PHYSIOLOGY	1	1.429

Types of Documents

Document Types	Record Count	% of 70
ARTICLE	62	88.571
REVIEW	5	7.143
LETTER	2	2.857
EDITORIAL MATERIAL	1	1.429

Awards/Extracurricular Activities

Web of Science ®

The citation analyses were performed using **Web of Science** database and the **Journal Citation Reports** in **December 2020**. These databases are accessible to U. of A . faculty, students and staff on and off-campus.

Although these databases cover a wide range of publications for each faculty member, they may not cover all of their research output. Other databases that may cover their publications include **PubMed**, **SciFinder** and **Reaxys**.

Top Citing Countries

Country	# of Occurrence
USA	383
ENGLAND	246
PEOPLES R CHINA	225
GERMANY	120
FRANCE	88
JAPAN	52
SPAIN	52
CANADA	40
NETHERLANDS	38
SOUTH KOREA	36

Top Citing Institutions

Institution	# of Occurrence
UNIVERSITY OF WARWICK	140
CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE CNRS	61
CHINESE ACADEMY OF SCIENCES	59
UNIVERSITY OF UTAH	53
UTAH SYSTEM OF HIGHER EDUCATION	53
NANJING UNIVERSITY	32
CNRS INSTITUTE OF CHEMISTRY INC	29
RUHR UNIVERSITY BOCHUM	29
UNITED STATES DEPARTMENT OF ENERGY DOE	28
UNIVERSITY OF OXFORD	28
BARCELONA INSTITUTE OF SCIENCE TECHNOLOGY	25
EAST CHINA UNIVERSITY OF SCIENCE TECHNOLOGY	25
UNIVERSITY OF CHINESE ACADEMY OF SCIENCES CAS	25
UNIVERSITY OF BARCELONA	24

Top Citing Journals

Journal Title	# of Occurrence
ANALYTICAL CHEMISTRY	135
JOURNAL OF THE AMERICAN CHEMICAL SOCIETY	52
JOURNAL OF PHYSICAL CHEMISTRY C	45
ELECTROCHIMICA ACTA	42
CHEMELECTROCHEM	39
LANGMUIR	39
ACS NANO	35
PHYSICAL CHEMISTRY CHEMICAL PHYSICS	32
ANGEWANDTE CHEMIE INTERNATIONAL EDITION	28
JOURNAL OF THE ELECTROCHEMICAL SOCIETY	23
NANOSCALE	23
CHEMICAL SCIENCE	22
CURRENT OPINION IN ELECTROCHEMISTRY	22
JOURNAL OF ELECTROANALYTICAL CHEMISTRY	22
NANOTECHNOLOGY	21

Most Recent Publication

Journal of The Electrochemical Society, 2020 **167** 166507

A High-Pressure System for Studying Oxygen Reduction During Pt Nanoparticle Collisions

Yulun Zhang, Donald A. Robinson, Kim McKelvey, Hang Ren, Henry S. White,* and Martin A. Edwards*

Department of Chemistry, University of Utah, Salt Lake City, Utah 84112, United States of America

Here we report measurements of the oxygen reduction reaction (ORR) at single Pt nanoparticles (NPs) through their collision with a Au microdisk electrode of lower electrocatalytic activity. Performing measurements at an elevated pressure (10 atm, pure O_2) raises the O_2 concentration ~50-fold over air-saturated measurements, allowing the ORR activity of smaller Pt NPs to be resolved and quantified, compared to measurements taken at atmospheric pressure. Single-NP ORR current vs potential measurements for 2.6, 16, and 24 nm radius citrate-capped Pt NPs, show the catalytic activity of the smallest Pt NPs to be roughly one order of magnitude greater than the activity of the larger NPs. The particle-by-particle nature of our measurement quantifies the distribution of electrocatalytic activities of individual particles, which we determine to be larger than can be explained by the distribution of particle sizes. Additionally, we report that some of the observed ORR current transients contain multiple sharp peaks per single-NP measurement, indicating multiple collisions of a single Pt NP at the electrode surface.
 [DOI: 10.1149/1945-7111/abcdc2]

Manuscript submitted May 5, 2020; revised manuscript received November 18, 2020. Published December 7, 2020.

Supplementary material for this article is available online

Top-Cited Papers

Anal. Chem. **2010**, *82*, 9141–9145

Letters to *Analytical Chemistry*

Localized High Resolution Electrochemistry and Multifunctional Imaging: Scanning Electrochemical Cell Microscopy

Neil Ebejer, Mathias Schnippering, Alexander W. Colburn, Martin A. Edwards, and Patrick R. Unwin*

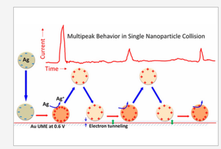
Department of Chemistry, University of Warwick, Coventry CV4 7AL, United Kingdom

Observation of Multipeak Collision Behavior during the Electro-Oxidation of Single Ag Nanoparticles

Stephen M. Oja†, Donald A. Robinson‡, Nicholas J. Vitti‡, Martin A. Edwards‡, Yuwen Liu‡, Henry S. White*‡, and Bo Zhang*†

Abstract

The dynamic collision behavior of the electro-oxidation of single Ag nanoparticles is observed at Au microelectrodes using stochastic single-nanoparticle collision amperometry. Results show that an Ag nanoparticle collision/oxidation event typically consists of a series of 1 to ~10 discrete "sub-events" over an ~20 ms interval. Results also show that the Ag nanoparticles typically undergo only partial oxidation prior to diffusing away from the Au electrode into the bulk solution. Both behaviors are characterized and shown to exist under a variety of experimental conditions. These previously unreported behaviors suggest that nanoparticle collision and electro-dissolution is a highly dynamic process driven by fast particle–electrode interactions and nanoparticle diffusion.



Scanning Micropipet Contact Method for High-Resolution Imaging of Electrode Surface Redox Activity

Cara G. Williams†, Martin A. Edwards†‡, Anna L. Colley†, Julie V. Macpherson†, and Patrick R. Unwin*†

Abstract

A scanning micropipet contact method (SMCM) is described which promises wide-ranging application in imaging and quantifying electrode activity at high spatial resolution. In SMCM, a moveable micropipet probe (diameter 300 nm to 1 μm) containing an electroactive species in electrolyte solution is brought to a sample electrode surface so that the liquid meniscus makes contact. The micropipet contains a reference-counter electrode, and the sample is connected as the working electrode to make a two-electrode voltammetric measurement. SMCM thus makes possible highly localized electrochemical experiments, and furthermore, heterogeneous electrode surfaces may be investigated without the substrate being completely immersed in solution. This opens up the possibility of making measurements on a wide range of electrode materials without having to encapsulate the electrode. Furthermore, the electrode/solution contact can be made rapidly and briefly, which is useful for situations where the electrode would be unstable for longer periods (e.g., due to corrosion or surface adsorption). For heterogeneously active surfaces the technique is particularly powerful as it allows defined areas to be targeted and individual sites to be probed. To exemplify the approach, the electroactivity of basal plane highly oriented pyrolytic graphite (HOPG) and two types of aluminum alloy were investigated. SMCM measurements indicate that basal plane HOPG shows much greater activity than present consensus. Measurements of chemically heterogeneous aluminum alloy surfaces with SMCM allow variations in redox activity to be mapped with high spatial resolution.

For more information: website: edwardslab.uark.edu, email: maedw@uark.edu and twitter handle: @MEdwardsLab

Prepared by Lutishoor Salisbury, Yang Tian and Jeremy J. Smith, CHBC Library, University of Arkansas. January 2021