

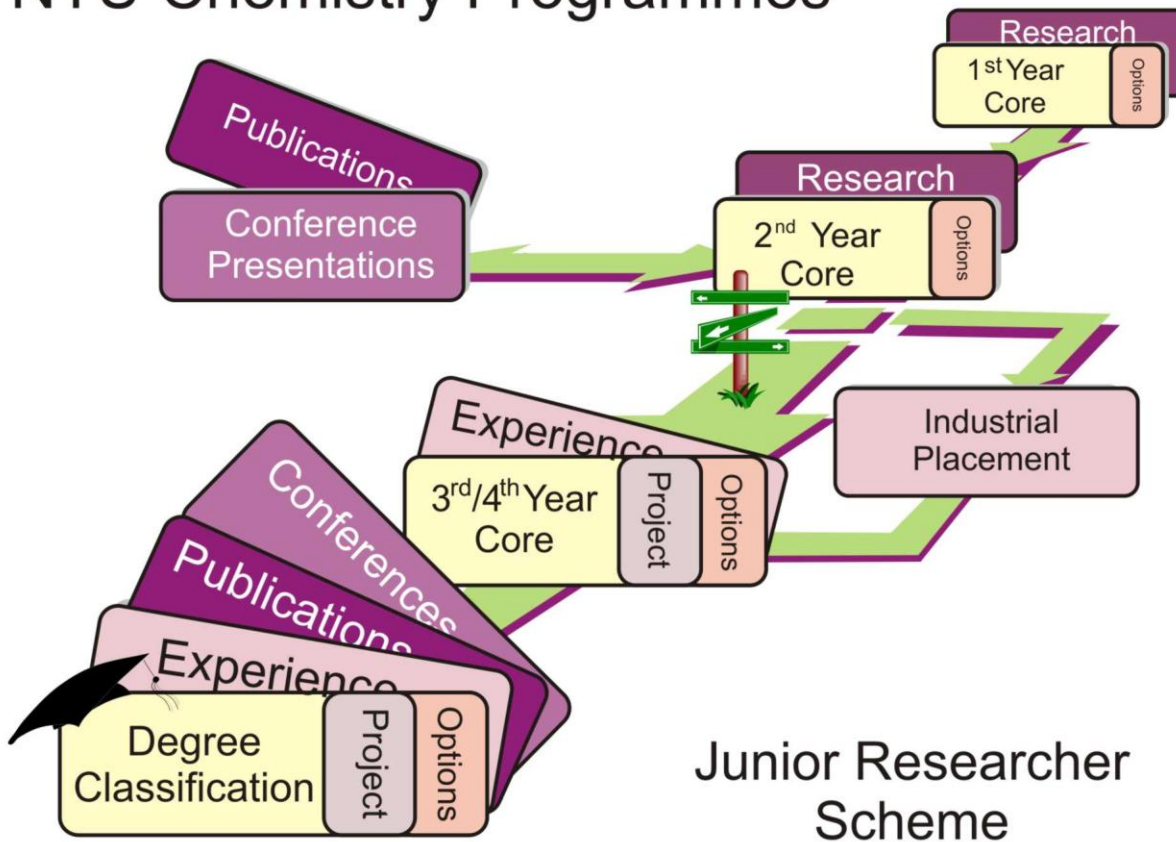
Research Mentoring

A Flexible Route to Enhancing Undergraduate Curricula

James Davis

Nottingham Trent University

NTU Chemistry Programmes



Providing Research Opportunities
for
1st and 2nd Year Undergraduates

Voluntary Scheme for Enhancing
Undergraduate Skills and Employment
Prospects

Aims – Objectives - Outcomes

Provide:

- Active participation in research
- Individual mentoring

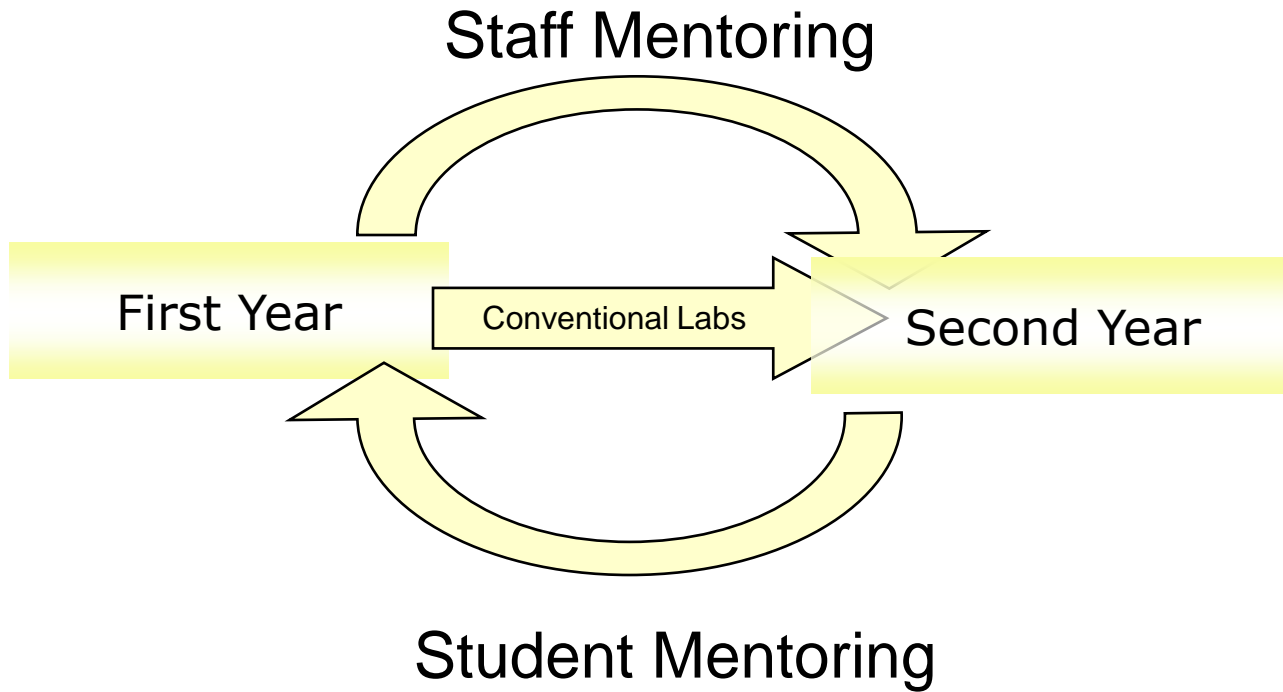
Enhance:

- Lab skills
- Real world problem solving
- Teamworking
- Communication skills

Gain:

- Responsibility
- Recognition
- Tangible Rewards

Scheme Management



Undergraduate Achievements

Solsona, I.A.; Smith, R.B.; Livingstone, C.; Davis, J.(2006)

Metabolic mimics: Thiol responsive drug release

Journal Colloid Interface Science, 302, 698

Kilbey, G.; Karousos, N.G. Eglin, D.; Davis, J. (2006)

Laser etched carbon fibre composites: Disposable detectors for flow analysis applications,

Electrochemistry Communications, 8, 1315

Platts, M.; Smith, R.B.; Mould, N.; Davis, J. (2006)

Ephedrine-copper-carbon interactions: An electroanalytical investigation

Electrochemistry Communications, 8, 633

Smith R.B.; Canton, C., Livingstone, C.; Davis J. (2006)

Molecular Anchors - Mimicking Metabolic Processes in Thiol Analysis

New Journal Chemistry, 30, 1718

Villalba MM, Litchfield VJ, Smith RB, Franklin AM, Livingstone C, Davis J (2007)

A chromatographic tool for preparing combinatorial quinone-thiol conjugate libraries

Journal of Biochemical and Biophysical Methods, 70, 797

Billington S, Cowham E, Karousos, NG, Smith RB, Davis J, (2008)

Covert Approaches to Countering Adult Chemophobia

Journal of Chemical Education, 85, 379-380

Brown K, Cowham E, Villalba MM, Smith RB, Mould N, Billington S and Davis J (2008)

Solvent Free Essential Oil Extraction – A Simple and Rapid Approach to Microwave Hydrodistillation.

Journal of Science Education, in press

Villalba MM, Litchfield VJ, Lawrence, NS, Smith RB, Franklin AM, Davis J (2008)

Rapid Assessment of the Latent Hazard Posed by Dissolved Mercaptans within Aqueous Effluent

Journal of Hazardous Materials, 154, 444-450

Litchfield VJ, Smith RB, Franklin AM, Davis J (2008)

Synthesis of acridine-quinone systems - A potential electrochemical fluorescent switch

Synthetic Communications, 38, 3447-3455

Desai, R, Villalba, MM, Lawrence, NS, Davis J (2008)

Green Approaches to Field Nitrate Analysis: An Electroanalytical Perspective

Electroanalysis, in press

News Front Page World UK England Northern Ireland Scotland Wales

Last Updated: Tuesday, 10 October 2006, 20:52 GMT 21:52 UK

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Chemistry students win top award

Four Nottingham Trent University students have won science award with their extensive database which explains how drug detection techniques work.

Katherine Brown, Sadie Hoyes, Rachel King, Amy Swain, James Davis

IsItBanned? is a student based resource that aims to provide readily accessible information on drug characteristics and the technologies that are used to detect their presence in a variety of physiological fluids. The site is managed and developed by students and is targeted principally at students who need to be able to understand the science that underpins the various tests that are available now and which are being developed.

The principal objective is to provide a clear independent and critical forum through which the issues that govern the use of such technology can be disseminated and openly discussed. The information contained within this site has been collated by students who need to be able to understand the science that underpins the various tests that are available now and which are being developed.

Topical issues in drug detection collated, delivered and managed by students

Exploring the science behind drug testing
Driving School Sports Workplace



- Continually updated dynamic format
 - Comprehensive list of over 400 drugs
 - Interdisciplinary content and contributions
 - News features placing the science in context
 - Serving students across a range of programmes
- The site offers an ideal opportunity to transform conventional coursework assignments.
- High quality submissions covering topical issues in drug detection would be published within the site offering tangible recognition to both student and supervising tutor.

NOTTINGHAM TRENT UNIVERSITY
School of Biomedical & Natural Sciences

Novel Strategies for the Transdermal Sensing of Amphetamine

Amy Judd, Doreen Sharp, Raymond Leslie and James Davis

Aims and Objectives
The aim of the project is to develop a non-invasive method of detecting illicit drug use by means of a micropatterned polymer (MP) sensor coupled to a custom designed complementary chip.

Background
Central to the design is the ability to rapidly preconcentrate the drug target through reverse osmosis directly at the skin surface but without damaging the skin. The project aims to investigate the design factors associated with the successful integration with a MP layer selective for amphetamine associated with the consumption of amphetamines by widespread sections of society.

Background
The prevalence of illicit drug abuse directly and indirectly affects all aspects of society, be it economic and/or social. The health, justice and welfare services cost the least amount of the national budget with the annual economic costs of illicit drug abuse to the public sector estimated at between £3.7bn and £5.6bn. It has been estimated that 30% of 16 to 18 year olds have used drugs in the lifetime and that 20% between the age of 15 and 24 year olds are more likely to have used drugs in the last month.

Summary
The project has given rise to considerable research highlighted by the media via 'news' featuring people under the age of 16 who are using drugs. This has led to a need for the design of a sensor that could be used in a non-invasive manner.

NOTTINGHAM TRENT UNIVERSITY

Designing Molecularly Imprinted Polymers for Drug Screening Applications

Bull, L., Lewis, S., Raymond, L. and James, D.

Aims and Objectives
The project seeks to investigate the suitability of a new synthetic strategy for the preparation of generic amphetamine-responsive materials that could be used for the production of molecularly imprinted polymers against a drug target.

Background
The use of illicit drugs has increased dramatically in recent years and there is a growing need for the development of robust screening devices that can provide immediate results at the time of sampling.

Summary
Molecularly imprinted polymers (MIPs) are synthetic materials with specific recognition toward target molecules - in this case our target is amphetamine. Molecular imprinting can be achieved by the retraction, either non-covalent or covalent, between complementary groups on a template molecule (pharmacological and functional monomer units through polymerization or crosslinking) with the template, the use of appropriate curing or reaction conditions and the removal of the template. The ability, ease of preparation and low cost of these materials make them particularly attractive. MIPs have been widely investigated for diverse applications (e.g., in chromatographic separation, drug screening, immunoassays, catalysis, immunoassays etc.) owing to their specificity towards the target molecule and high stability against environmental perturbations. However, they have traditionally been prepared using bulk polymerization for amphetamine. Amphetamine has a high degree of volatility and a low boiling point, which makes it difficult to handle through which greater control can be achieved in terms of the location of the polymer film such that it could be used with a microfluidic or set on a chip screening device.

NOTTINGHAM TRENT UNIVERSITY

Laser Activated Carbon Composites Optimised for the Detection of Neurochemicals

Suezy Eliaz, Maria Marin Villalba and James Davis

Aims and Objectives
The aim of the project is to develop a novel detector system based on a composite micropatterned carbon composite which can be used for the detection of neurochemicals. The composite consists of a porous carbon composite which is coupled to a custom designed complementary chip.

Background
Building a rapid assay in today's society with over 1 million people consuming alcohol in each 2000 alone. Building and testing of assays is a costly and time-consuming process. There is a need for a rapid assay that can be used for the detection of neurochemicals. There is a need for a rapid assay that can be used for the detection of neurochemicals.

Summary
Letting a laser beam excite the carbon composite has been shown to be a viable method for the detection of neurochemicals. The composite consists of a porous carbon composite which is coupled to a custom designed complementary chip.

NOTTINGHAM TRENT UNIVERSITY

Biofilm Resistant Coatings for Smart Implants

James Davis, Doreen Sharp, Raymond Leslie and James Davis

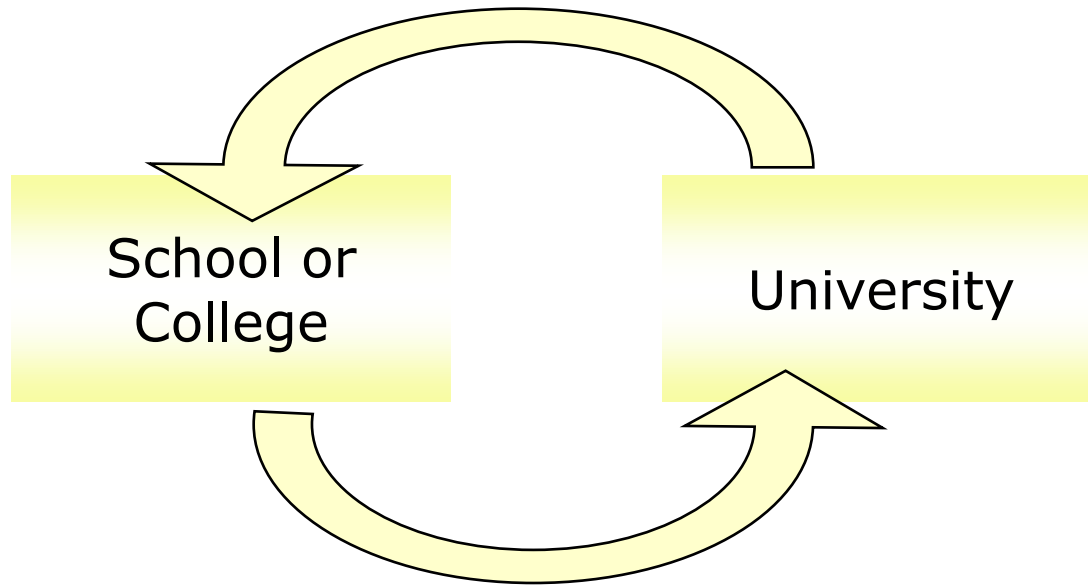
Aims and Objectives
The project aims to develop a novel strategy for the preparation of smart implants that can be used for the detection of drug target.

Background
The use of smart drugs has increased dramatically in recent years and there is a growing need for the development of robust screening devices that can provide immediate results at the time of sampling.

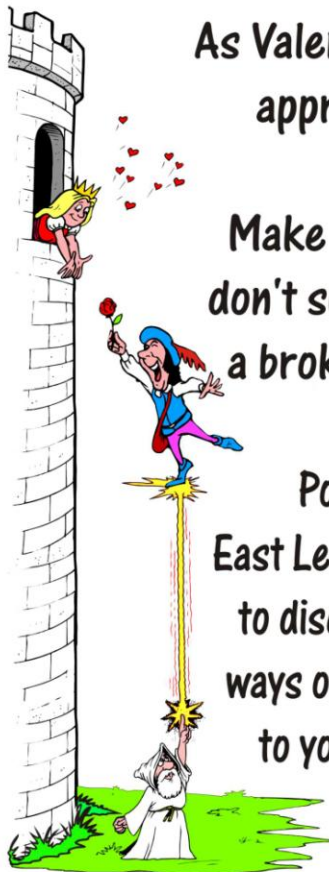
Summary
Biofilm resistant coatings for smart implants have been developed. The coatings are made of a porous carbon composite which is coupled to a custom designed complementary chip.

Some Recent Posters Presented at National and International Conferences by Students

Bridging the Science Gap



East Leake Library - 2nd February



As Valentine's Day approaches

Make sure you don't suffer from a broken heart

Pop into East Leake Library to discover new ways of listening to your heart

NOTTINGHAM
TRENT UNIVERSITY

Activities, information and competitions for young and old



Acknowledgments

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