



# SULSA Supported Facilities Roadshow.

Aberdeen 16<sup>th</sup> September 2010



## The Centre for Translational and Chemical Biology (CTCB) University of Edinburgh.

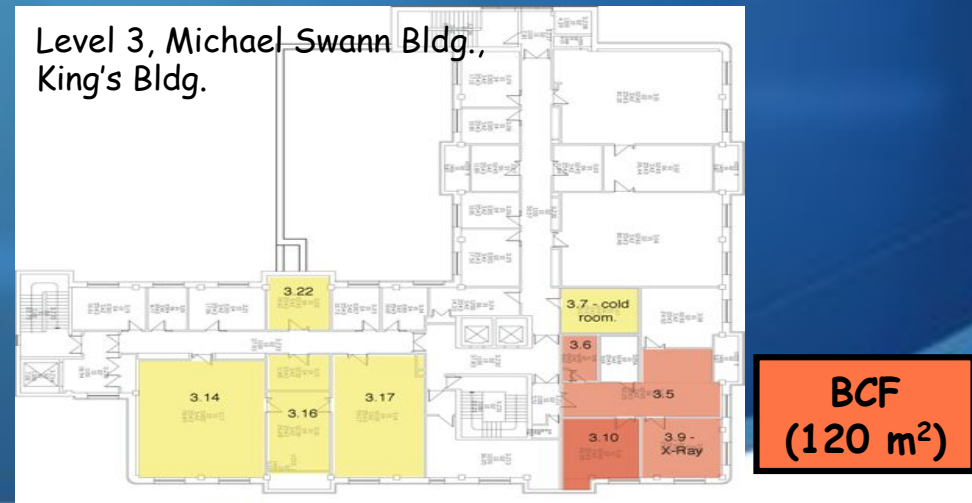
Martin Wear  
CTCB Facilities Manager

# The Centre for Translational and Chemical Biology (CTCB) University of Edinburgh.

- ✧ CTCB is a network of over 70 independent research labs with expertise in protein production and purification, biophysical characterisation, molecular biology, structural biology, virtual screening, HT-screening (Prof. M. Tyres and M. Auer) and structure based drug design.
- ✧ Opened 7<sup>th</sup> April 2008, with the aim of providing a centre with set of centralised core facilities and expertise focused on generating academic and commercial translational activities, nationally and internationally.
- ✧ Funds provided by UoE (~ £1.3 M) The Wellcome Trust (~ £1 M), SULSA (~ £0.75 M) and the BBSRC (~ £0.35 M) for lab infrastructure, staff and equipment.

# The Centre for Translational and Chemical Biology (CTCB), University of Edinburgh.

- ✧ Central to the CTCB are two laboratories - the Protein Production Facility (PPF) and the Biophysical Characterisation facility (BCF) - that provide a wide range of core resources, dedicated to rapid the production, characterisation and screening of target proteins and their ligands.
- ✧ The labs are centres of excellence hosting state-of-the-art equipment and are resourced by a team of experienced core staff (3 SULSA funded).
- ✧ These core facilities also provide a multidisciplinary training environment, for undergraduates to PIs. Outreach and rolling training programs.



# The Protein Production Facility (PPF)

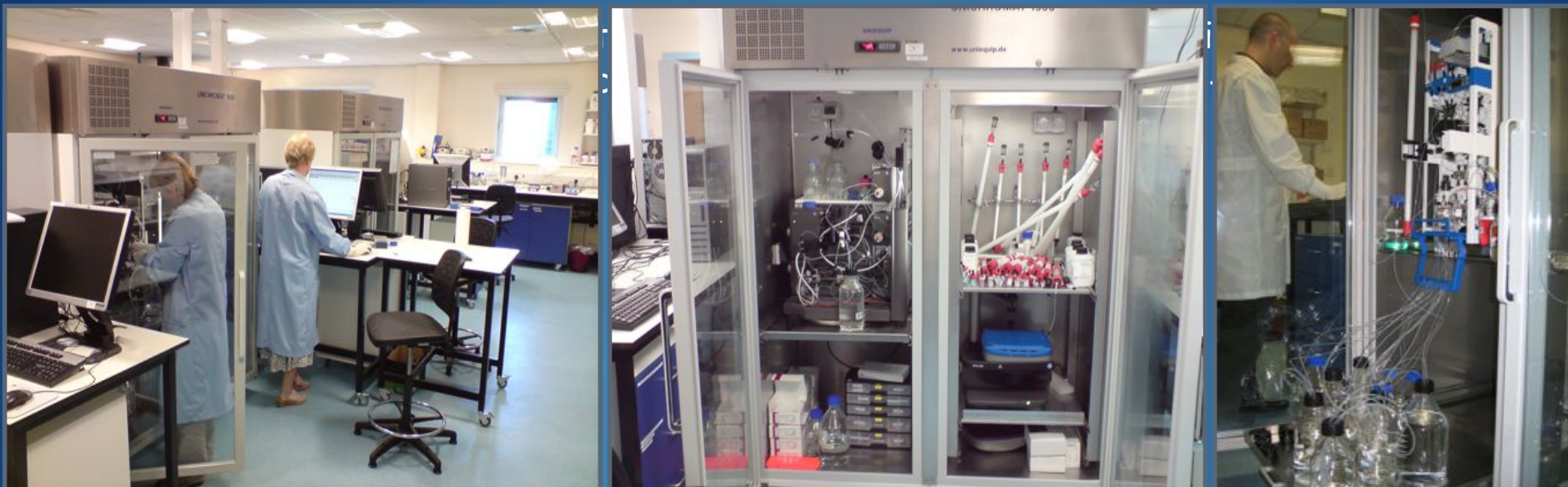
✧ **Hotel/End-user** protein production and purification facility. ~ 200 registered users from academia, biotech and industry. Thru-put of > 30 proteins per month.

# The Protein Production Facility (PPF)



- ✧ Bacterial (*E. coli*) and yeast (*Pichia*) expression platforms. Baculovirus - planned.
- ✧ Automated cell lysis equipment with a sample handling capacity from ~ 1 ml to 20 L of cell suspension (bacteria, yeast, insect, mammalian, plant, native tissue).
- ✧ Access to increasing library of expression vectors and expression strains. 'Standardised' GATEWAY-based cloning strategy available.
- ✧ Liquid handling robotics for HT-expression/solubility screening and cloning.

# The Protein Production Facility (PPF)



- ✧ Purification suite - 10 networked liquid chromatography systems.
- ✧ Includes automated, unattended parallel purifications systems and a dedicated DNA/ RNA HPLC.
- ✧ Sample handling capacity; 10  $\mu$ l to 20 L.
- ✧ Access to an extensive (80 +) core column library and large range of chromatography consumables.

# The Biophysical Characterisation Facility (BCF)

- ✧ Unique centralised biophysical analysis facility in custom renovated lab space. Many of the platforms have 96/384 well plate capacity, allowing MTP/HTP screening/analysis capabilities.
- ✧ **Hotel/end-user** system for thermodynamic, spectroscopic and structural studies of protein-protein and protein-ligand interactions.

# The Biophysical Characterisation Facility (BCF)



- ✧ **BIAcore-T100 SPR** (affinity & kinetics for proteins, DNA, small molecules. Extensive range of SPR consumables).
- ✧ **MicroCal AutoITC** (direct measurement of thermodynamics).
- ✧ **CD** (Secondary structure analysis).
- ✧ **Multimode plate reader** (UV/Vis, FP, fluorescence lifetime, luminescence).
- ✧ **Thermal Shift Assay** (rtPCR adapted for ligand/stability screening).
- ✧ **Dynamic Light Scattering** (Purity/oligomeric state analysis. Internal liquid handling).
- ✧ **Mass Spec** (Electro Spray and MALDI).
- ✧ **X-ray** (RIGAKU micro focus beam). Oryx 8 crystallisation/plate visualisation robots.
- ✧ Access to in-house developed **EDULISS** small molecule database (~ 6 M compounds) and the **LIDAEUS**, **UFSRAT** and **STP** modelling/*in silico* screening programs.
- ✧ **Cryo EM** and **NMR** also accessible. **Multi-angle Static Light Scattering** - planned.

# Computational Tools

Dr. Paul Taylor

- ✧ Web-based access. User initiated/defined runs. Automated output and data scoring/ranking.
- ✧ **EDULISS**: small molecule database of over 5 million commercially available compounds.
- ✧ **LIDAEUS**: docking program. Fits 2M compounds in 4 hrs.
- ✧ **STP**: Binding-site prediction program. Uses the propensities of triplet atom-types and their patterns to indicate whether a patch is likely to be a binding site or not.
- ✧ **UFSRAT**: Molecular similarity search program. Builds geometric distributions of atoms based on properties such as hydrogen bond donor/acceptor and hydrophobic properties.

# Computational Tools

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**EDULISS**  
EDinburgh University Ligand Selection System

EDinburgh University Ligand Selection System, known as EDULISS, is a relational database system that aims to meet the database mining needs of the academic community through establishing a large depository of molecular descriptor values relating to over 5.3 million (3,776,760 unique) freely available chemicals.

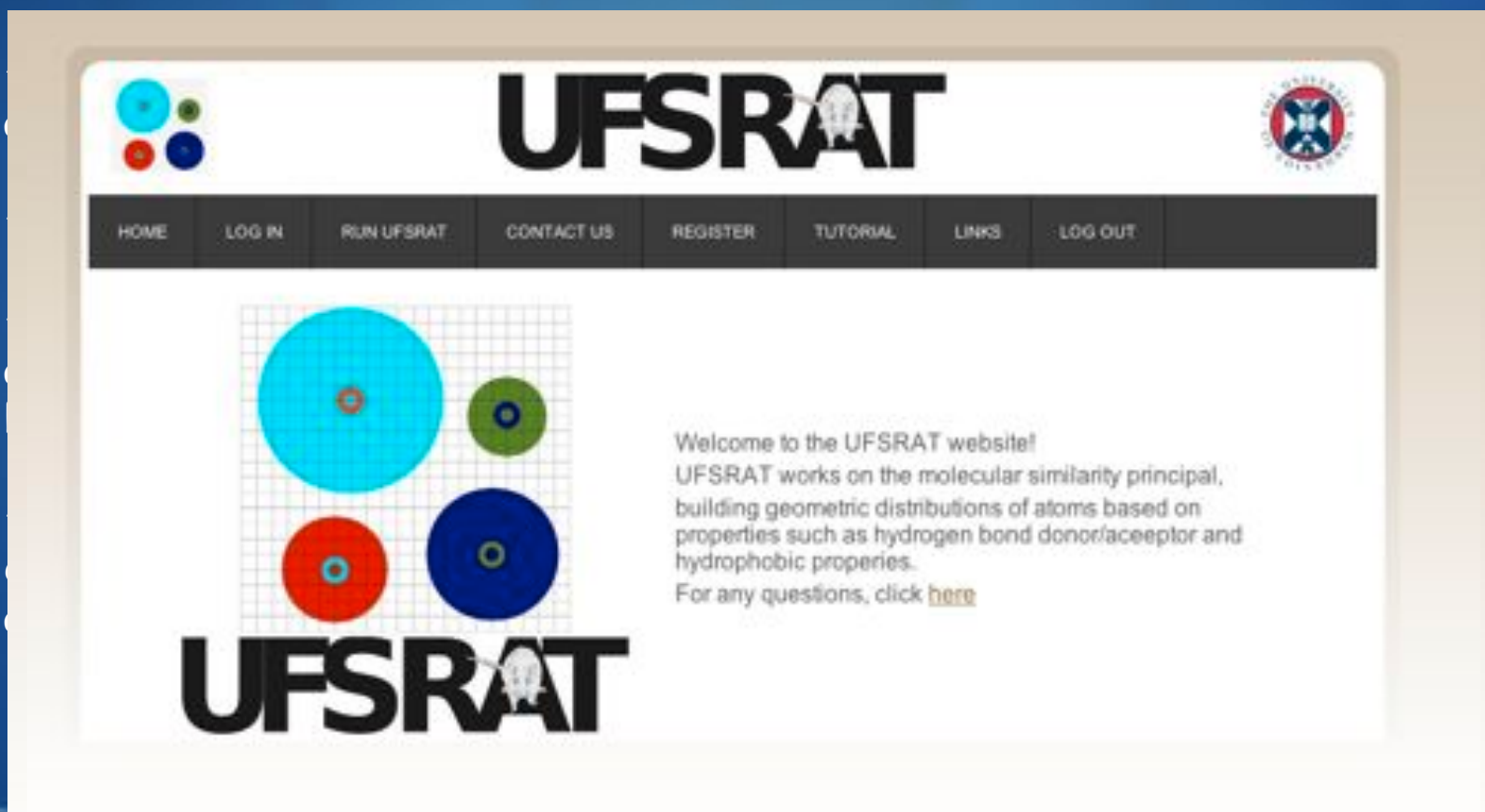
- Descriptor-based search
- Similarity search
- Search by pose distances
- Search by ID

**GO**

# Computational Tools

Dr. Paul Taylor

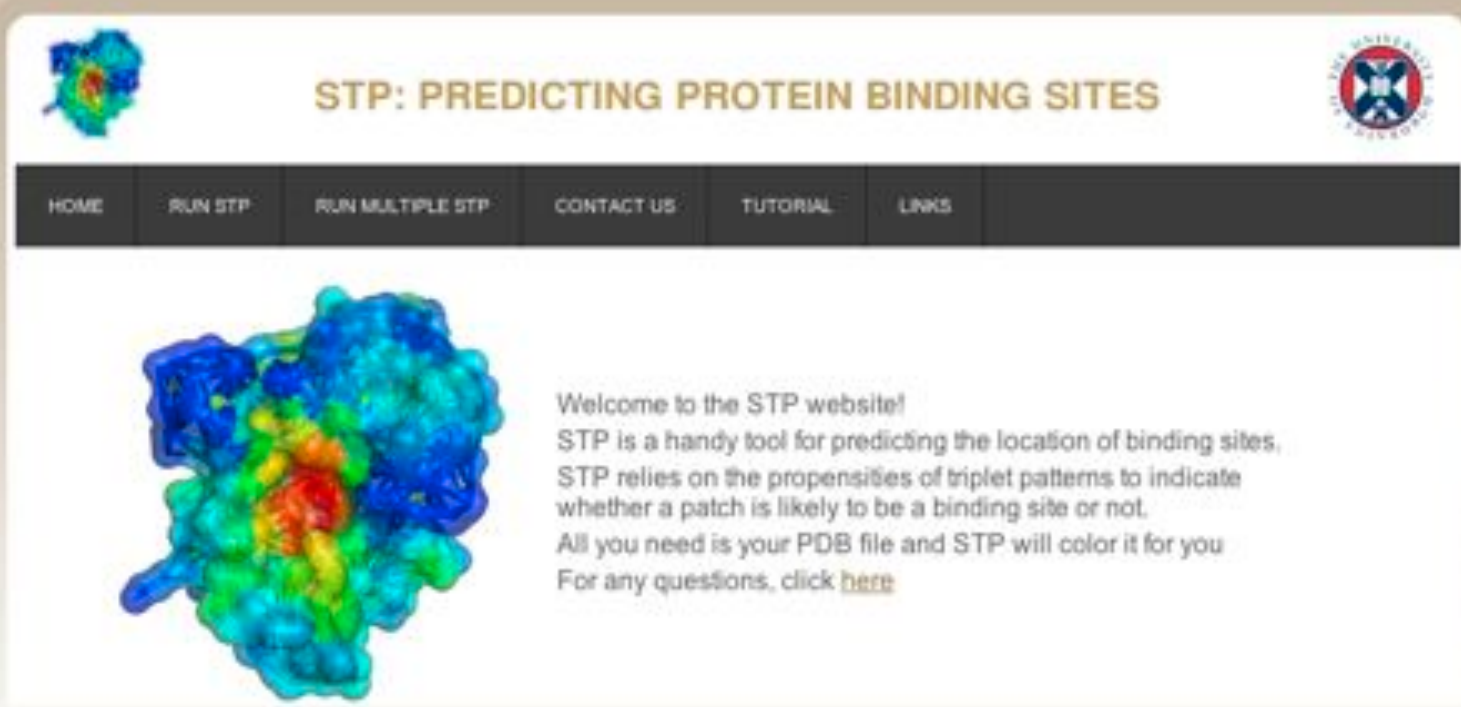
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# Computational Tools

Dr. Paul Taylor

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**STP: PREDICTING PROTEIN BINDING SITES**

HOME RUN STP RUN MULTIPLE STP CONTACT US TUTORIAL LINKS

Welcome to the STP website!  
STP is a handy tool for predicting the location of binding sites,  
STP relies on the propensities of triplet patterns to indicate  
whether a patch is likely to be a binding site or not.  
All you need is your PDB file and STP will color it for you  
For any questions, click [here](#)

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- ✧ CTCB is a centre with set of centralised core facilities and expertise focused on generating academic and commercial translational activities, nationally and internationally.
- ✧ Running/consumable costs - access charges apply. Platform and project specific. Ranges from £10 per day (cell lysis, incubation), £55 per day (LC usage) to £195 per day (SPR).

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## Acknowledgements.

- CTCB core staff:

Prof. Malcolm Walkinshaw (Director)

Dr. Martin Wear (Facilities manager/protein production/biophysical characterisation)

Dr. Janice Bramham (Biophysical manager/NMR)

Sandra Bruce (Protein production)

Dr. Liz Blackburn (biophysical analysis, protein production)

Dr. Matt Nowicki (biophysical analysis, protein production)

Dr. Paul Taylor (X-ray, bioinformatics, modelling, database management)

Dr. Keith Finlayson (commercialisation, knowledge transfer, service).

- Dr. Steve Shave (UFSRAT) and Wissam Mehio (STP)

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- Many, many colleagues in the CTCB and beyond.