



Company Profile

Charnwood Molecular was previously known as Charnwood Catalysis and was re-named in January 2003 to reflect more accurately the broad range of services that we can provide in outsourced synthesis and research. The original company was co-founded by Professor Steve Allin and Professor Philip Page in 1998 at Loughborough, UK.

Services

Our core competence is synthetic organic chemistry and we can provide the highest level of service in the following areas:

■ *Custom Synthesis*

We can carry out multi-step organic synthesis to prepare compounds up to 20L scale

- Synthesis of advanced intermediates
- Synthesis of monomers for library generation
- Synthesis of metabolites and reference standards
- Synthesis of polymer-supported reagents and catalysts

■ *Contract Research*

Where there is no literature precedent available for a desired compound we can investigate methods of preparation and route optimisation on a time/costs basis. Postdoctoral chemists are available for research and development projects on an FTE basis in many areas including:

- Synthesis of novel compounds
- Discovery Chemistry Services/Medicinal Chemistry
 - Focused libraries of high purity can be designed and synthesised using parallel synthesis and automated purification techniques
 - Expertise in applying a wide variety of computational techniques to structure-based drug design and project support
 - Synthesis of analogues in support of lead optimisation
- Process Research and Development
 - Synthetic route design and optimisation
 - Development of asymmetric processes
 - Development of catalytic processes

■ **Medicinal Chemistry Services**

■ Lead Discovery

- Synthesis of reference compounds for validation of screens and analogues of these compounds
- Synthesis of analogues of natural ligands
- Synthesis of de novo designed compounds
- Synthesis of analogues of a hit from high throughput screening (HTS)
- Re-synthesis of a hit from HTS
- Structure/purity confirmation of a hit from HTS
- Synthesis of isomers of a hit or lead compound
- Literature investigations

■ Lead Optimisation

- Synthesis of analogues around a lead compound
- Analysis of SAR
- Parallel synthesis of analogues
- Bioisosteric replacements
- Patent exemplification
- Improvement of physical properties e.g. solubility

■ Development

- Route development and scale-up
- Synthesis of pro-drugs
- Synthesis of putative metabolites

Therapeutic areas

Our medicinal chemists have experience of working in various therapeutic areas including oncology, obesity, immunology and the treatment of cardiovascular diseases.

Facilities

Our laboratories are equipped to the most modern standards for carrying out synthetic organic chemistry.

■ *Single Compound Synthesis*

- Reactors up to 20 litre capacity operating at temperatures from $-78\text{ }^{\circ}\text{C}$ to $+200\text{ }^{\circ}\text{C}$
- Buchi BEP280 autoclave system working up to 12 bar
- CEM microwave synthesis system
- Fisher Ozone Generator

■ *Parallel Synthesis/Evaporation/Purification*

- Radleys Carousel Reactors
- Radleys Greenhouse Parallel Synthesisers
- Genevac DD4
- Isco Sq 16x Open Access Purification System

■ *Analytical Equipment*

- High field NMR spectrometers (400 MHz)
- Applied Biosystems API 150EX LCMS
- Gilson preparative/analytical HPLC
- Mass spectrometry (EI, CI, FAB, electrospray)
- GCMS, HPLC (including chiral analysis)
- Elemental analysis
- FT-IR spectroscopy
- X-ray crystallography

Literature Access

We have excellent access to current and archived chemical literature.

- Access to patents via on-line resources
- Beilstein
- ACD

People & Strategy

Our strengths lie in the people we employ. All research personnel are PhD qualified organic chemists. Their research experience is wide-ranging but particular expertise exists in heterocyclic chemistry, asymmetric synthesis and catalysis, and polymer-supported organic synthesis.

Our strategy is to employ the most talented chemists and to invest in the latest technology and equipment in order to provide the highest quality and service for outsourced research and synthesis.

Key Personnel

Professor Philip Page (Scientific Director) graduated from Imperial College and completed doctoral studies with Professor Steve Ley before undertaking postdoctoral work with Professor Leo Paquette at Ohio State University. He has held academic appointments at the University of Liverpool (Lecturer, Senior Lecturer, Reader), Loughborough University and the University of East Anglia, where he is currently Professor of Organic Chemistry. He is author of 200 academic publications and has an international reputation and proven research expertise in asymmetric catalysis, natural product chemistry and asymmetric synthesis.

Professor Steven Allin (Scientific Director) graduated from the University of Liverpool with a degree in Chemistry and Pharmacology. He obtained his Ph.D. from Liverpool in the area of asymmetric synthesis and gained postdoctoral experience with Professor Alan R. Katritzky at the Center for Heterocyclic Compounds, University of Florida. He has held academic appointments at the University of Huddersfield (Lecturer) and Loughborough University (Lecturer, Senior Lecturer, Reader). He currently holds the position of Professor of Organic Chemistry at Keele University, and is author of over 75 academic publications. He has a proven research record in heterocyclic chemistry, asymmetric synthesis and polymer -supported synthesis.

Dr. Michael J. McKenzie (Head of Operations) graduated from the University of Liverpool with a degree in Chemistry. He remained at Liverpool to complete his Ph.D. in asymmetric synthesis with Professor Phil Page, followed by postdoctoral experience with Professor Phil Page and Dr. Andrew Carnell in the field of enzymatic/whole cell asymmetric transformations and then with Professor Page and Dr Jim Gallagher in the area of bone disease therapeutics. Since August 1999 he has been Head of Chemistry at Charnwood Molecular.

Dr Paul Bradley (Head of Medicinal Chemistry) graduated from the University of Leeds with a degree in Chemistry. Paul holds a PhD in Synthetic Organic Chemistry (Leeds University) and has over 20 years postdoctoral experience in the UK pharmaceutical industry. Prior to joining Charnwood Molecular in June 2011, he worked as a Synthetic Medicinal Chemist at Knoll Pharmaceuticals (11 years) and more recently at Pfizer (10 years) in Sandwich.

He has worked on diverse classes of medicinal chemistry targets in a variety of therapeutic areas. These include opioid agonists and ion channel modulators (pain), progesterone antagonists, beta-3 agonists, NK2 inhibitors (urology), soluble guanylate cyclase inhibitors and NEPi inhibitors (cardiovascular), D2 antagonists/5-HT1a agonists (antipsychotics) and other targets in the obesity, oncology and immunology therapeutic areas. Paul has a proven track record of success in medicinal chemistry helping to deliver 12 NCE's into development and 3 small molecules into Phase 2 clinical trials. This is supported by an impressive publication record in both medicinal and synthetic chemistry (approximately 30 scientific publications which are patents, papers and reviews).

Derek Faries (Business Development Manager) graduated from the University of Leeds with a degree in Colour Chemistry. He has experience in the fine chemicals industry, working on projects for pharmaceutical, agrochemical and reprographic applications and also process research. Prior to joining Charnwood Molecular in April 2000, he was involved in the development of sales and marketing at Lancaster Synthesis.

Dr. Ritesh Chauhan (Business Development Manager) graduated from the Nottingham Trent University with a MChem degree in Chemistry. He obtained his PhD in Organic Chemistry under the supervision of Professor Steven Allin at Loughborough University. He joined Charnwood Molecular Ltd in 2006 as a Senior Research Chemist and was appointed as BDM in November 2007.

Dr. Sylvain Blanc (Business Development Manager) graduated from the University of Marseille I and III in Chemistry. He obtained his PhD in Organic Chemistry under the supervision of Professor Philip Page at Loughborough University. He joined Charnwood Molecular Ltd in 2004 as a Senior Research Chemist and was appointed as BDM in December 2007.