



CMAC

**FUTURE MANUFACTURING
RESEARCH HUB**

Prof Alastair Florence

ADDoPT PMC

March 6th 2017

Collaboration Makes Sense...

Being in a band is always a compromise. Provided that the balance is good, what you lose in compromise, you gain by collaboration. *Mike Rutherford*

Good design begins with honesty, asks tough questions, comes from collaboration and from trusting your intuition. *Freeman Thomas*

It is the long history of humankind (and animal kind, too) those who learned to collaborate and improvise most effectively have prevailed. *Charles Darwin*

Alone we can do so little; together we can do so much. *Helen Keller*

If everyone is moving forward together, then success takes care of itself. *Henry Ford*

Many ideas grow better when transplanted into another mind than the one where they sprang up. *Oliver Wendell Holmes*

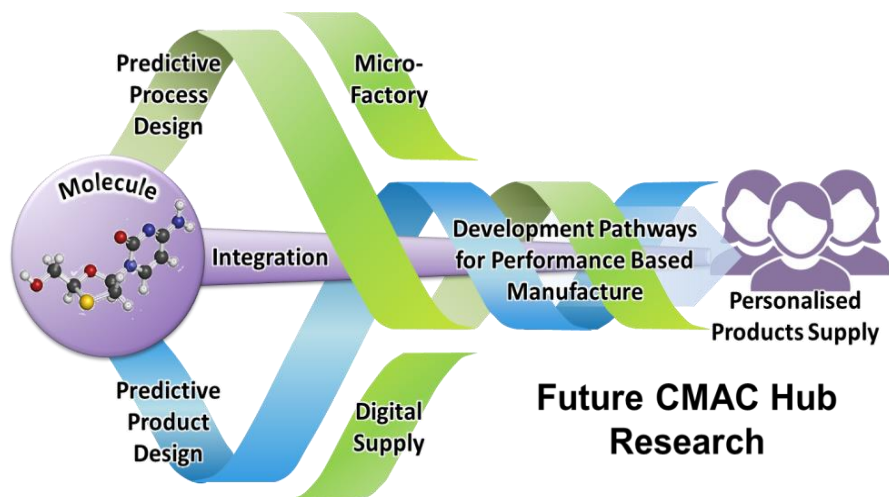
Politeness is the poison of collaboration. *Edwin Land*

The secret is to gang up on the problem, rather than each other. *Thomas Stallkamp*

- Established 2011, Industry demand led
- Portfolio of Funded Programmes – shaping the innovation landscape
 - **EPSRC Future Manufacturing Research Hub (2017- 2023)**
 - Training & studentships,
 - Capital & infrastructure
 - Basic, Applied and Translational Research Programmes
- 130 staff and rising : international talent
- Pre-competitive=leverage Portfolio of confidential projects
- Hub @ £100m Technology Innovation Centre @ Strathclyde
- 7 Tier 1s :GSK, AZ, Novartis, Bayer, Takeda, Lilly, Roche
- 16 Tier 2 technology companies



Vision: To deliver predictive design tools and novel integrated continuous processing platforms for the supply of next generation high performance personalised products.



Innovation Spokes



Academic Partners



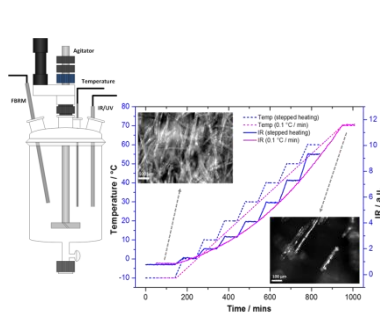
Supporters / End Users



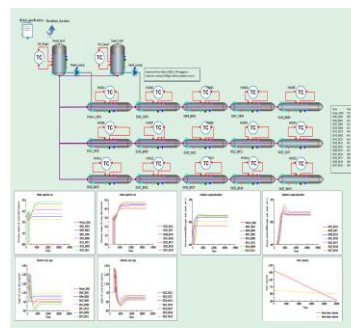
CMAC: Predictive Process Design and Microfactory Ecosystem

- *Develop using minimal material exploiting predictive modelling*
- *Control crystal attributes for enhanced manufacturability and performance*
- *Demonstrate simplified, integrated, flexible continuous process streams*

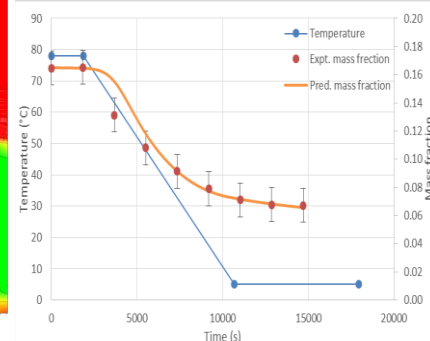
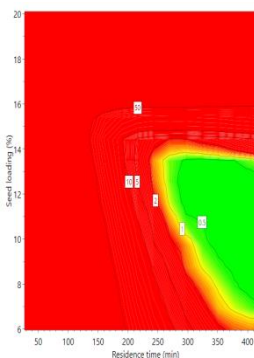
WP1: Predictive Design / Development Pathways



Measure



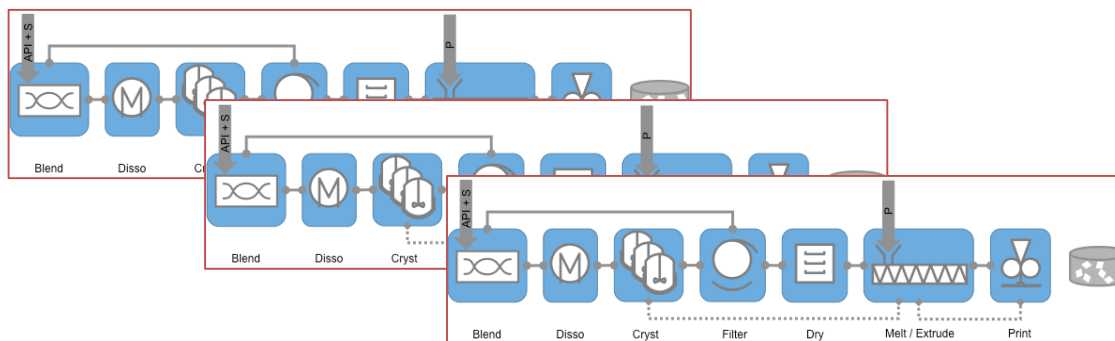
Model



Test

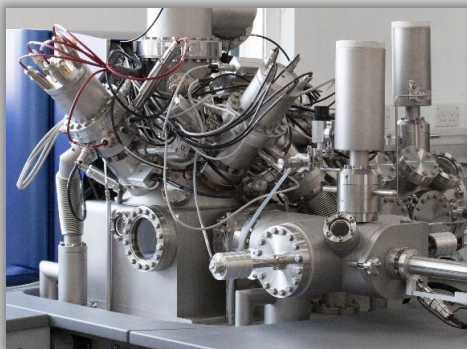
WP3: Demand, Opportunity, Impact

WP2: Microfactories






Flexible, Modular, Integrated Platforms

Award Winning Facility for Continuous Manufacturing and Crystallisation Research



Process, PAT, Automation & Control, Analysis & Characterisation

-  World Class Manufacturing Research Facility accelerating the adoption of continuous manufacturing
-  Unique expertise in continuous crystallisation, process development, formulation and product analysis
-  With continuous process skids for process development, state-of-the-art analysis and characterisation capabilities, comprehensive suite of PAT tools

For more information contact national-facility@cmac.ac.uk



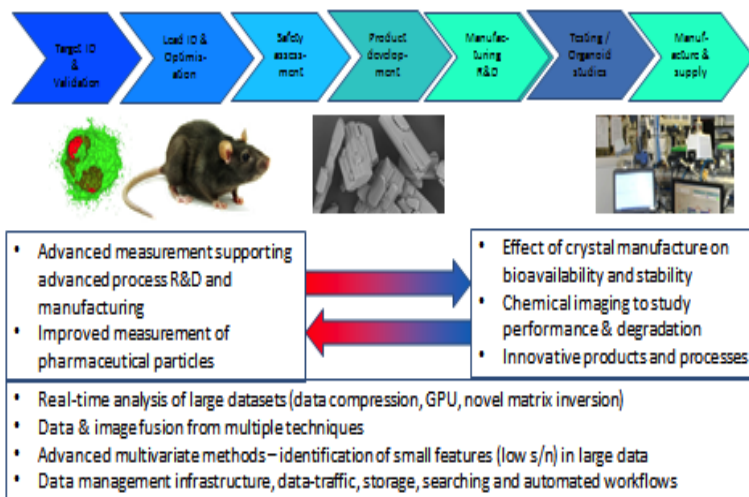
FOYA | 2016

Facility of the Year Awards

Honorable Mention

CMAC and NPL

Pharmaceutical Innovation and Manufacturing Metrologies Theme



NPL - Commercial

Thematic areas

- Data science challenges
- Novel in situ process analytical tools
- Measurement of composition, dynamics and structure in formulated systems

MIT-CMAC

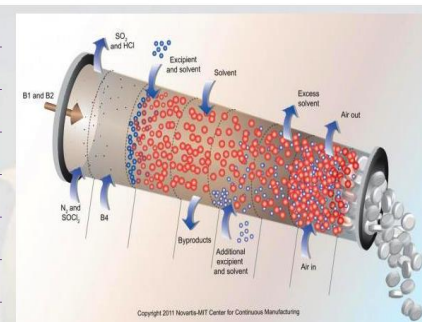
2nd International Symposium on Continuous Manufacturing of Pharmaceuticals

Implementation, Technology & Regulatory

September 26–27, 2016



- Home
- Agenda
- Abstracts
- Poster Session
- Want to Attend?
- Hotel Accommodations
- Conference Location
- 2016 Regulatory White Paper
- 2014 ISCMP Website
- 2014 CM White Papers



Schematic Vision of Continuous Manufacturing of Pharmaceuticals

In 2014 Janet Woodcock, Head of CDER at the FDA, has asked us to set up a symposium to align on making continuous pharmaceutical manufacturing a reality! Thus, we set up a symposium at MIT on May 20–21, 2014 organized by MIT and the Continuous Manufacturing and Crystallisation Consortium (CMAC) to accomplish this goal. The 2014 edition



Spring-boarding from our successful 1st International Symposium on Continuous Manufacturing of Pharmaceuticals (ISCMP), sponsored by CMAC and MIT/Novartis on May 27–28, 2014, we are planning a follow-up symposium, September 26–27, 2016, at the Royal Sonesta Hotel in Cambridge, MA, near MIT. This venue provides a pleasant and convenient site and allows us to expand the number of participants. As before, it will be by invitation only with the aim of getting representatives from a broad stakeholder community.

Based on feedback from the 2014 symposium, we plan to have a tangible output, with case studies, identification of technology gaps, proposals for addressing those gaps, and a draft document that can help inform future regulatory guidelines. We will form working groups with key stakeholders and post draft documents to the website to solicit for input from the community. Please continue with correspondence from

- Community events in 2014, 2016
- Series of whitepapers output from 2014
- Regulatory whitepaper output from 2016
- Planning for an EU regulatory event 2017



I2APM

International Institute for
Advanced Pharmaceutical Manufacturing

Advancing the science and technology of integrated primary and secondary continuous manufacturing of pharmaceutical products





CMAC

**FUTURE MANUFACTURING
RESEARCH HUB**

www.cmac.ac.uk