



WELCOME

COMPACTION SIMULATION FORUM 2013

The Compaction Simulator Forum was launched in 2012 to connect scientists interested in compression technology and in particular the compaction simulation of tablets and ribbons.

This is an ever changing and developing area; we are pleased to announce the 2nd annual forum to share the best of what this technology can achieve.

This year's Forum and Conference will take place June 4th and 5th 2013.

University of Cambridge is hosting the 2013 Compaction Conference on campus in Cambridge, UK.

Program Committee:

Kevin J Bittorf (Chair), Living Proof, Inc.;
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Jean LeFloch, Huxley Bertram;
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James Elliott, University of Cambridge, Materials
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Elaine Harrop Stone, Merlin Powder Characterisation;
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Sharon Inman, GlaxoSmithKline

Kendal Pitt, GlaxoSmithKline

Kate Boxell, Pfizer

Greg Thoorens, FMC

Clare Medendorp, Millennium:
The TakedaOncology Company



FITZWILLIAM COLLEGE
UNIVERSITY OF CAMBRIDGE

Fitzwilliam College
University of Cambridge
CB3 0DG Cambridge
United Kingdom



Key Dates:

Compaction Course:
Monday, June 3, 2013

Compaction Simulation Forum:
Tuesday, June 4 - Wednesday, June 5, 2013

Welcome Reception:
Monday, June 3, 2013, 7 – 10pm
Sponsored By:

**Huxley
Bertram**

Poster Presentations, Cocktails & Dinner:
Tuesday, June 4 2013, 5 – 10pm
Sponsored By:



Phoenix

Registration Details available at:
www.CompactionSimulation.com



Compaction Simulation Forum

CONNECTING SCIENTISTS AND COMPRESSION TECHNOLOGY



CSF PRE-COURSE

COMPACTION PRE-COURSE

Monday 03 June

Short Course on Powder Modelling and Compaction Simulation

The goal of the course is provide an intensive deep dive into the science of compression, teach relevant modelling techniques for pharmaceutical development, and be hands on Quality by Design (QbD) experimentation with a focus on compaction simulation applications. This course is limited to 5 to 10 participants to maintain to provide more personal instruction for the hands on portions of the course. The course syllabus is as follows:

Part 1: Modelling of Powder Compaction (Dr. James Elliott) 9:00-12:30

- Bulk powder behavior under shear flow and compaction
- Revision of stress analysis, including the concepts of yield locus and Mohr circle construction.
- Definition of the Coulomb yield criterion and discussion of Mohr-Coulomb failure analysis for powder beds.
- Methods for characterizing the flowability of powders, including the Jenike shear cell.
- Stress analysis of powders using finite and discrete element methods
- Stress analysis via Janssen-Walker theory for compaction of powders in cylindrical die
- Computational methods for dealing with complex powders, including the discrete (or distinct) element method and finite element analysis.
- Review of continuum constitutive equations for powders, including the Drucker-Prager Cap (DPC) and Cam-Clay models
- Show how these can be parameterized from uniaxial compaction data from instrumented dies.
- Hands on computational modelling session.
 - With the use of ABAQUS (finite element package),
 - How to set up a compaction model and enter material parameters

Part 2: Compaction Simulation (Dr. Kevin J. Bittorf) 1:30-5:00

- Examination of QbD principles in relation to compaction simulation
 - Importance and application of how compaction simulation in QbD submission
 - Logical and efficient experimental design to determine required powder and tablet properties required for performance
 - Live design for experimental testing section
- Hands on experimental testing
 - With the use of the Huxley-Bertram compaction simulator
 - Examination of various experimental parameters

As this is an intimate course, participants are encouraged to provide the instructors topics and/or experiments they would like to see covered.

Dr. James Elliott, Department of Materials Science, University of Cambridge

Dr. Kevin Bittorf, VP Process Development and Analytical Technologies, Living Proof





CSF PROGRAMME

WELCOME
RECEPTION

Monday 03 June

Welcome Reception: King's College, 7-10pm, hosted by Huxley Bertram

**Huxley
Bertram**

KEYNOTE
ADDRESS

Tuesday 04 June

Modelling-led compaction simulation: a tool for Pharmaceutical powder formulation

Dr. James Elliott, Department of Materials Science, University of Cambridge

Analysis and interpretation of compaction simulator data

Dr. Csaba Sinka, Mechanics of Materials Research Group, University of Leicester

PRESENTATIONS

Tuesday 04 June

Performance of formulated APIs into RC tablets: From the Compaction Simulator to the Production Scale Gerteis MiniPactor

Claire Tridon, GlaxoSmithKline

Micromechanics of granule deformation during compaction, determined by small-angle X-Ray scattering

Dr Peter Laity, School of Applied Sciences, University of Huddersfield

Simulating the Capsule Filling Process

Ian Smales, Pfizer

Simulation of tableting and the real-world payoff

Kendal Pitt, GSK

Excipients characterisation, an apple-to-apple comparison?

Gregory Thoorens, Senior Scientist, FMC BioPolymer

COCKTAILS
AND POSTER
PRESENTATION

Tuesday 04 June

Cocktail Reception Hosted By Phoenix Calibration. Poster Presentation Prize Sponsored By Pfizer.



Registration Details:
www.CompactionSimulation.com



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CSF PROGRAMME

KEYNOTE
ADDRESS

Wednesday 05 June

Powder bed heterogeneities as a tool for tailoring product performance
*Prof. Alberto Cuitino, Mechanical & Aerospace Engineering, Rutgers University
NSF-ERC for Structured Organic particulate Systems*

PRESENTATIONS

Wednesday 05 June

Principal Component Analysis as a Useful Tool in Tableting
*Prof. Dr. Annette Bauer-Brandl, University of Southern Denmark
Prof. Dr. Ingunn Tho, Department of Pharmacy, University of Tromso*

Multi-scale modelling and simulation as a cost-effective tool for design and optimisation of powder compaction processes
*Dr. Marcial Gonzalez, Mechanical & Aerospace Engineering, Rutgers University
NSF-ERC for Structured Organic Particulate Systems*

Multiscale Modelling of Pharmaceutical Powder Compaction
*Dr. Jonathan Loh, Pfizer Institute for Pharmaceutical Materials Science, Univ. of Cambridge
Dr. William Ketterhagen, Pfizer Worldwide R&D, Groton CT
Dr. James Elliott, Pfizer Institute for Pharmaceutical Materials Science, Univ. of Cambridge*

Experimental study and analysis of breakage of pharmaceutical tablets
Dr. Chenglong Shang, Department of Engineering, University of Leicester

Modelling entrapped air induced fracture during pharmaceutical tablet manufacturing
Prof. Chuan-Yu Wu, Department of Chemical and Process Engineering, University of Surrey

Terahertz spectroscopy: toward in-die analytics and modelling
Dr. Axel Zeitler, Department of Chemical Engineering & Biotechnology, Univ. of Cambridge

Conclusion: Tablet presses and compaction simulators, what does the future hold?
Jean LeFloch, Programme Committee, Compaction Simulation Forum

Monday 03 - Thursday 06 June

4:30-7:00 PM and as needed on Thursday morning.
Small groups of attendees will be shuttled to Huxley Bertram to see a servohydraulic compaction simulator in action.

**Huxley
Bertram**

SIMULATOR
DEMONSTRATIONS

Registration Details:
www.CompactionSimulation.com



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CSF 2013 CONFERENCE PROGRAMME
See abstracts at www.CompactionSimulation.com

Monday June 3rd

Guided Tour of Cambridge: 5 pm - 7 pm

Welcome Reception: 7 pm - 9 pm at King's College, hosted by Huxley Bertram

CSF Day 1 Tuesday, June 4th	
8:15 - 9:00	Breakfast and Registration
9:00 - 9:10	Welcome: Kevin J. Bittorf, President of the CSF
9:10 - 10:10	Keynote #1: Modelling-led compaction simulation: a tool for Pharmaceutical powder formulation <i>Dr. James Elliott, Department of Materials Science, University of Cambridge</i>
10:10 - 10:25	Break
10:25 - 11:25	Keynote #2: Analysis and interpretation of compaction simulator data <i>Dr. Csaba Sinka, Mechanics of Materials Research Group, University of Leicester</i>
11:25 - 12:30	User Presentations and Round Table
12:30 - 1:30	Lunch and Poster Presentations
SIMULATION and CHARACTERISATION	
1:30 - 2:00	Performance of formulated APIs into RC tablets: from the Compaction Simulator to a Production Scale Roller Compactor , Claire Tridon, GlaxoSmithKline
2:00 - 2:30	Micromechanics of granule deformation during compaction, determined by small-angle X-ray scattering , Dr. Peter Laity, University of Huddersfield
2:30 - 3:00	Simulating the Capsule Filling Process , Ian Smales, Pfizer
3:00 - 3:20	Break
3:20 - 3:50	Simulation of tableting and the real-world payoff , Dr. Kendal Pitt, GlaxoSmithKline
3:50 - 4:20	Excipients characterisation, are we measuring the right attributes? Greg Thoorens, FMC
4:20 - 5:00	Round Table on Simulation and Characterization
5:00 - 7:00	Cocktails and Poster Presentation hosted by Phoenix Calibration
7:00 - 9:00	Dinner
CSF DAY 2: Wednesday, June 5th	
8:30 - 9:00	Breakfast and Registration
9:00 - 10:00	Keynote #3: Powder bed heterogeneities as a tool for tailoring product performance <i>Prof. Alberto Cuitino, Mechanical & Aerospace Engineering, Rutgers University NSF-ERC for Structured Organic particulate Systems</i>
10:00 - 10:40	Round Table of Keynote Speakers
10:40 - 11:00	Break
MODELLING and ANALYSIS	
11:00 - 11:30	Principal Component Analysis, as a Useful Tool in Tableting , Dr. Ingunn Tho, University of Tromso and Dr. Annette Bauer-Brandl, University of Southern Denmark
11:30 - 12:00	Multi-scale modelling and simulation as a cost-effective tool for design and optimisation of powder compaction processes , Dr. Marcial Gonzalez, Rutgers University
12:00 - 12:30	Multiscale Modelling of Pharmaceutical Powder Compaction , Dr. Jonathan Loh, University of Cambridge; Dr. William Ketterhagen, Pfizer Worldwide R&D, Groton CT; Dr. James Elliott, Pfizer Institute for Pharmaceutical Materials Science, University of Cambridge
12:30 - 1:30	Lunch and Poster Presentations
1:30 - 2:00	Experimental study and numerical analysis of breakage of pharmaceutical tablets Dr. Chenglong Shang, University of Leicester
2:00 - 2:30	Modelling entrapped air induced fracture during pharmaceutical tablet manufacturing Dr. Chuan-Yu Wu, University of Surrey
2:30 - 3:00	Terahertz spectroscopy, toward in-die analytics and modelling Dr. Axel Zeitler, University of Cambridge
3:00 - 3:20	Break
3:20 - 4:00	Round Table on Modelling and Analysis
4:00 - 4:30	Conclusion: Tablet presses and simulators, what does the future hold? Compaction Simulation Forum organizing committee's summary








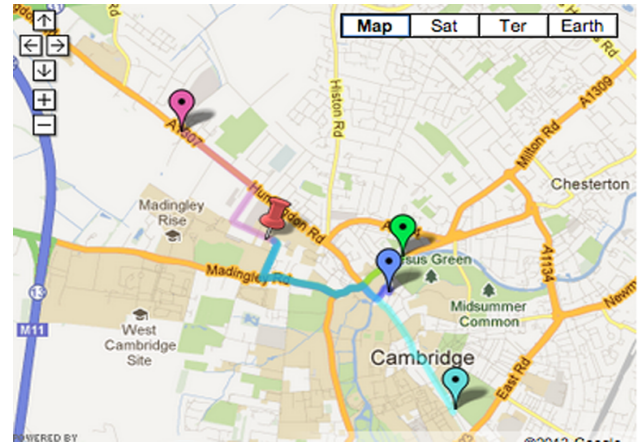


REGISTRATION & TRAVEL

HOUSING

The 2013 Compaction Simulation Forum will take place at the University of Cambridge, Fitzwilliam College Campus. For the ease and convenience of travelers, the following properties are recommended.

-  **Fitzwilliam College**
University of Cambridge
CB3 0DG Cambridge, UK
-  **The Varsity Hotel & Spa, Cambridge**
<http://www.thevarsityhotel.co.uk>
£165 – £205 per room.
-  **Regent Hotel**
<http://www.regenthotel.co.uk/>
Book via website quoting reference CSF2013
-  **Premier Inn**
<http://www.premierinn.com>
Rooms from £56
-  **Arundel House Hotel**
<http://www.arundelhousehotels.co.uk/cambridge/index.php>
Telephone 0044 01223 367701
Booking reference: HUXL030613
*Room block held through May 6th, £85 per room



REGISTRATION

Registration is now open for the Compaction Course and the Forum. Pre-registration is required for all activities. Payment pricing is in USD. Conversion rates will be processed by your credit card company. Registration rates are as follows:

Forum Only: Industrial Attendee	\$650.00
Forum Only: Academic Attendee	\$325.00
Forum Only: Student Attendee	\$163.00
Forum Only: One Day Pass (either day)	\$400.00
Compaction Course Only (1day)	\$1,800.00
Compaction Course + Forum (3 days) * <i>Best Value</i>	\$2,200.00

To register, please visit:
www.CompactionSimulation.com



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