

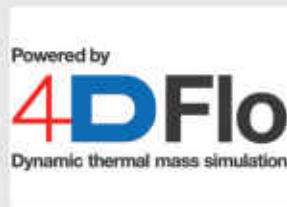
## Consultancy Services

Breathing Buildings is the UK's leading provider of natural and low-energy ventilation systems. In addition to a thriving equipment supply business, our experienced design team offers consultancy services to architects, project managers, M&E consultants and contractors.

With over 50 years of combined experience designing sustainable buildings throughout the UK and abroad, Breathing Buildings broad range of expertise and design services is unique in the industry, and is proven in supporting design teams on complex, challenging projects.

### Overheating Analysis

- Dynamic thermal modelling, optimised to meet TM52, CIBSE Guide A, PSBP/FOS, BB101 or bespoke overheating compliance
- Thermal modelling to meet BREAAAM 2014
- Overheating risk assessments and reports - full design responsibility & PI insurance



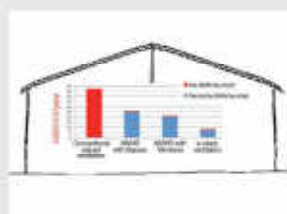
### Intelligent Controls

- Development of standard and bespoke ventilation schemes
- Textual description of operations for implementation by BMS specialists
- Use of monitored building data to inform control strategy



### System Energy Modelling

- In-house and IES energy modelling to optimise heating, ventilation and cooling scenarios
- Advice on payback period when implementing natural or mechanical ventilation solutions



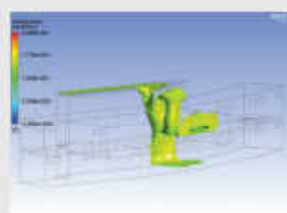
### Physical Experiments

- Laboratory-scale analogue water-bath modelling
- Simulation and visualisation of natural ventilation flows



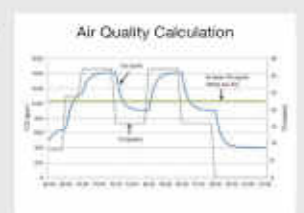
### CFD Modelling

- Prediction and visualisation of air distribution patterns
- Modelling of detailed spatial variations in temperature, CO<sub>2</sub> levels and air velocities



### Wintertime Ventilation

- Numerical modelling of CO<sub>2</sub> build up within each space
- Application of theoretical plume modelling to determine temperature and velocity of air at the occupied zone



**EDUCATION**

### Fulston Manor Secondary School, Kent

**Our Client:** Morgan Sindall

**Design Team:** Lee Evans Partnership, PCS Consulting

**Brief:**

- Meet BB101 and BREAAM summertime overheating requirements with an atrium scheme
- Ensure provision of BB101 minimum ventilation and CO<sub>2</sub> levels in the teaching spaces
- Demonstrate air distribution within the atrium to determine voids required between ground floor and first floor

**Breathing Buildings Services:**

CFD modelling of temperature and CO<sub>2</sub>, overheating analysis using 4DFlo dynamic thermal modelling software, theoretical/numerical modelling of CO<sub>2</sub> concentration


**PUBLIC**

### Fitzwilliam Museum Cambridge

**Our Client:** AECOM

**Design team:** SOS, PA Collacott

**Brief:**

- Reduce energy demand for conditioning the gallery whilst maintaining strict internal conditions:  $T_{INT}$ : 18-24°C &  $RH_{INT}$ : 40-60%

**Breathing Buildings Services:**

Bespoke overheating analysis and relative humidity modelling, control strategy description of operations, on-site witnessing


**COMMERCIAL**

### New Office Building, Central London

**Our Client:** Foster + Partners

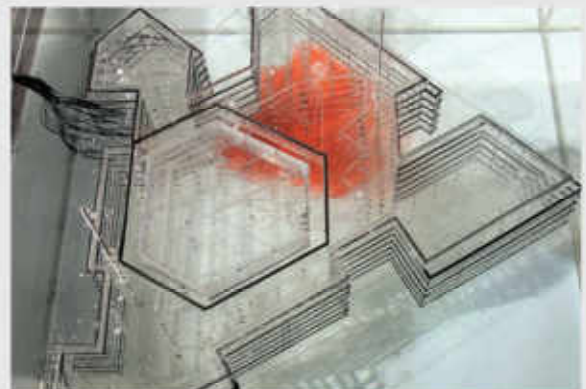
**Design Team:** Sir Robert McAlpine, Grontmij

**Brief:**

- Determine potential air pathways through the building
- Compare natural and hybrid ventilation for maintaining acceptable thermal comfort and reducing energy consumption

**Breathing Buildings Services:**

Laboratory-scale water-bath modelling for visualisation of airflow pathways, energy modelling to determine whole-building energy consumption, façade design advice, control strategy description of operations



## Office Building Refurbishment, Central London

**Our Client:** CLSH Management Ltd

**Design Team:** Smith Caradoc-Hodgkins Architects

**Brief:**

- Compare natural, hybrid and mixed-mode ventilation options
- Determine ventilation openings, peak cooling load and hours of cooling required under each option
- Report predicted annual energy consumption and capital costs

**Breathing Buildings Services:**

Overheating analysis using 4DFlo dynamic thermal modelling software, product performance analysis, energy modelling, capital cost analysis



REFURBISHMENT

## Houghton-Le-Spring Primary Care Centre

**Our Client:** Sunderland Primary Care Trust

**Design Team:** P+HS Architects, Wilmott Dixon, LJJ

**Brief:**

- During occupied hours, the internal air temperature should not exceed 25°C for more than 200 hours per year
- Find innovative ways to incorporate thermal mass

**Breathing Buildings Services:**

Laboratory water-bath modelling to demonstrate flow regimes, thermal mass and air flow modelling, control strategy design and implementation, equipment supply



HEALTHCARE

## Oracle Shopping Centre, Reading

**Our Client:** Hammerson UK

**Design Team:** Max Fordham, HFM Architects, Workman, Wates Retail, IBMS

**Brief:**

- Justify removal of mechanical plant nearing its design life
- Improve thermal comfort during summer and winter

**Breathing Buildings Services:**

Natural ventilation feasibility study, waterbath modelling to assess airflow directions, overheating analysis including mall-store cooling interaction, entranceway improvement recommendations, control strategy design, witnessing, monitoring



RETAIL

Led by CEO Dr Shaun Fitzgerald, Breathing Buildings multi-disciplinary team of consulting engineers have an unparalleled range of expertise and have designed low-energy ventilation systems for over 300 buildings in the UK and overseas. With backgrounds including theoretical research, experimental modelling, mechanical services engineering, HVAC specification, control system design, computer programming, management consultancy, and even architecture, the team offers a unique blend of skills and experience.



**Shaun Fitzgerald** MA PhD CEng FEI  
FCIBSE FEng **CEO**

- World-leader in the field of natural ventilation. Numerous papers published in high profile journals, including Journal of Fluid Mechanics and Nature. Advisor to renowned architects, engineers and government departments on natural ventilation and regulation
- Royal Academy of Engineering Visiting Professor in Sustainable Buildings, University of Cambridge



**Fiona Dickinson** MA MSc  
**Consulting Team Leader**

- MA Architecture, University of Cambridge. MSc Civil Engineering, University of Southampton. Specialises in zero carbon office buildings and low energy building design techniques
- Four years of industry experience designing naturally ventilated and hybrid buildings



**Matthew Bray** BEng MPhil PhD CEng  
MIMechE **Engineering Manager**

- Leads regular design workshops and drop-in clinics at client offices to discuss natural ventilation concepts and strategies
- Extensive experience of equipment commissioning and performance monitoring post-occupancy



**David Palmer** MEng AMIMechE  
**Systems Engineer**

- Applies a passion for engineering and product design to solve the industry's most challenging problems
- Responsible for development of complex control algorithms, integrating natural ventilation with BMS, cooling, heating and mechanical ventilation systems



**Joe Clawley**

- Eleven years in the construction industry, including five years in the natural ventilation sector
- Multi-disciplined approach, working closely with all stakeholders from concept design through to final commissioning and project handover



**Iskender Gencer** BSc (Eng.) MSc CEng  
MIMechE

- BSc in Mechanical Engineering, MSc in Engineering Business Management, University of Warwick. MSc in Energy Systems and Thermal Processes, Cranfield University
- Six years designing and promoting mechanical air conditioning and ventilation



**Owen Connick** MEng PhD AMIMechE

- PhD in fluid mechanics of hybrid ventilation: historical study of building physics research, theoretical and experimental modelling of mixed-mode ventilation flows
- Extensive knowledge of renewable energy and sustainability in the built environment



**Nick Wise** MEng

- MEng University of Cambridge
- Responsible for development of 4DFlo thermal modelling software

## Contact Us

To book a consultancy focussed seminar:

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