

NND2015 @



The University of
Nottingham

UNITED KINGDOM • CHINA • MALAYSIA



**2015 Nice-Nottingham Days
of Waves in Complex Media (NND2015)**

1-3 July 2015

School of Mathematical Sciences,
University of Nottingham,
University Park Campus,
United Kingdom

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The second workshop ``Nice-Nottingham Days of Waves in Complex Media'' will be held in Nottingham, United Kingdom, from the 1st to 3rd of July 2015. This year the workshop is dedicated to wireless communications, electromagnetic compatibility (EMC), stochastic sources, wave shaping and chaos. Keeping close to the spirit of this workshop, each presentation and session will be followed by a substantial amount of time dedicated to discussions.

Organizing committee:

Gabriele Gradoni (Nottingham)

Gregor Tanner (Nottingham)

Stephen Creagh (Nottingham)

Ulle Kuhl (Nice)

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Toshiba TRL & University of Bristol, UK

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Program

Wednesday, 1st July 2015

8.50-9.00	Welcome Message	Gregor Tanner
SESSION:	Electromagnetic Reverberation Chambers and Environments	<u>Ulle Kuhl</u>
9.00-9.30	Field Uniformity in Chaotic Reverberation Chambers: An RMT Approach	Olivier Legrand
9.30-10.00	Field Uniformity in Chaotic Reverberation Chambers: Experimental validation	Elodie Richalot
10.00-11.00	Coffee Break (1 hour)	
11.00-11.30	FDTD massive simulation of reverberation chambers inspired by chaotic cavities	Franco Moglie
11.30-12.00	Time-domain characterization of mode-stirred operation: can we do it?	Luk Arnaut
12.00-12.30	Measurement of electromagnetic field attenuation by building walls	Davide Micheli
12.30-14.30	Lunch (2 hours)	
SESSION:	Wave theories and modelling	<u>Gregor Tanner</u>
14.30-15.00	Wave field shaping in cavities: waves trapped in a box with controllable boundaries	Geoffroy Lerosey
15.00-16.00	Coffee Break (1 hour)	
16.00-16.30	Statistical model for coupling of EM energy into enclosures	Thomas Antonsen
16.30-17.00	Propagation of correlation functions and the Van Cittert-Zernike theorem	Gabriele Gradoni
17.00-17.30	Propagation of noisy fields within enclosures: a transfer operator approach	Stephen Creagh

Thursday, 2nd July 2015

SESSION: Complex wave systems

9.00-9.30 Electromagnetic compatibility of complex equipment or systems:
modelling issues and possible solutions

9.30-10.00 Wave front shaping with IQ-Modulators in quasi-1D systems

10.00-11.00 Coffee Break (1 hour)

11.00-11.30 Experimental Measurements of Stochastic Field Propagation

11.30-12.00 Assessing stochastic effects in an aerospace context

12.00-14.00 Lunch (2 hours)

SESSION: Chaos, Semiclassics and Random Matrix Theory

14.00-14.30 Scaling of vortex knots in random 3D eigenfunctions

14.30-15.00 Connectivity of wireless networks in complex environments

15.00-15.30 Border effects in interference limited wireless networks

15.30-16.00 Coffee Break (0.5 hour)

16.00-16.30 RMT Approach to Model Non-Stationary Correlations:
Finance as an Example

16.30-17.00 Path decomposition and semiclassical approximation
in quantum mechanics

17.00-17.30 Resonance width distribution beyond Porter-Thomas

19.30- Dinner at the ``Larder on Goosegate''

Gabriele Gradoni

Philippe Besnier

Julian Böhm

David Thomas

Trevor Benson

Stephen Creagh

Mark Dennis

Carl Dettman

Orestis Georgiou

Thomas Guhr

Nark Nyul Choi

Dmitry Savin

Friday, 3rd July 2015

SESSION: Numerical Methods		<u>David Thomas</u>
9.00-9.30	Properties of cyclostationary stochastic electromagnetic fields	Peter Russer
9.30-10.00	Near-Field Modeling of cyclostationary stochastic electromagnetic fields	Johannes Russer
10.00-11.00	Coffee Break (1 hour)	
11.00-11.30	Transverse Waves formulation: Attributes for Time-Frequency Hybrid Formulation & Stochastic Analysis	Damienne Bajon
11.30-12.00	Parametric Identification of Stochastic EMI Sources Based on Near-Field Measurements	Yuri Kuznetsov
12.00-14.00	Lunch (2 hours)	
14.00-14.30	Computation of high-frequency wave energy distributions using discrete flow mapping	Janis Bajars
14.30-15.30	An innovative wave technique applied to electromagnetic mid- frequency	Andrea Barbarulo
15.30-16.00	Coffee Break (0.5 hour)	
SESSION: Signals and Circuits		<u>Trevor Benson</u>
16.00-16.30	Power Integrity, Signal Integrity, EMC/EMI in Integrated Circuits and Systems: Towards Multi-Physics Energy-Oriented Approaches	Sidina Wane
16.30-17.00	Broadband high-frequency generation in semiconductor superlattice coupled to external resonator	Alexander Balanov
17.00-17.15	Concluding Remarks	<u>Gregor Tanner</u>

Meals & refreshments will be provided to the registered attendees. Lunch & coffee breaks will take place in front of the Lecture Theatre A30.

Please ask Gabriele Gradoni or Gregor Tanner for your badge.

Accommodation

We have organised accommodation for everybody in the **Lenton and Wortley Hall**. The hall will provide *breakfast* for residents as well as *dinner* for the conference participants. It is located a few minutes walking distance away from the School of Mathematical Sciences building. On the University Campus map, **Lenton and Wortley Hall** is situated near building 52. In case of late arrival, there will be a number on the main porter lodge that can be called. A member of the staff will come and provide you with your room keys. Guests can check in 24 hours with a member of the hall staff being on site until midnight and then the call will direct to security after this time.

Please note that you can get to the Hall either via Derby Road or Beeston Lane. Also, note that there is a tiny walkway (yellow arrow) connecting the Hall Offices (close to Derby Road) to the bus stop (**Lenton UN13**) in A52:



A view from the upper bus stop (direction: Nottingham city centre) towards the walkway passage is shown below:



Travel

The new School of Mathematical Sciences Building is located on the main campus, University Park Campus (building no. 20 on the University Campus map). The talks will be in Nottingham Lakeside Arts Centre (building no. 50, Lecture Theatre room A30) next to the Music and to the Psychology Buildings. An overview how to get to the University Park Campus is available on the following pages.

Flights: the best option beside East Midlands Airport (EMA) is Birmingham International and Stansted Airport. Birmingham International (BHX) Airport is a 45-minute taxi ride (£56) or 1 1/2 hour train ride away from Nottingham. From Stansted Airport (STN), you best take the train via Ely and Peterborough, which is not too expensive (always buy return tickets which are often much cheaper than two singles). This journey takes 3 hours, but it is through nice countryside. Train tickets can be booked through <http://www.nationalrail.co.uk/>.

A number of bus services run from the city centre to the University campus at University Park. There are buses from Nottingham train station and buses from East Midlands Airport.

An electronic journey planner can be found on www.travelineeastmidlands.co.uk. Note that at bus stops, you need to put out your hand to indicate to the driver that you want to use this bus.

If you have a late evening/night arrival flight, we suggest to pre-book a taxi well in advance. For information on taxis, see below.

Buses:

- **From Nottingham train station**

For University Park campus, the bus stops closest to the train station are Broadmarsh bus station (for Trent Barton's Indigo and Sky-link services) or Canal Street (for Nottingham City Transport's 13 and 14 services). Get off the bus at "University south entrance".

www.trentbarton.co.uk/services/indigo

www.trentbarton.co.uk/services/skylinknottingham

www.nctx.co.uk/lines/maroon-line

- **To/From Lenton Hall bus stop**

Bus routes to and from the Nottingham city centre serving the Lenton Hall bus stop are *21*, *i4*, and *Indigo*.

Taxis

Avoid rogue and unlicensed taxi drivers (Nottingham City Council licenses two types of vehicles: Hackney Carriages and Private Hire vehicles). Hackney Carriages can be hailed in the street, Private Hire vehicles need to be pre-booked.

We recommend the following taxi companies in Nottingham:

- 1) **DG Cars** (+44115 9 500 500 or +44115 9 607 607)
- 2) **Yellow cars** (+44115 9 818 181 or <http://www.yellowcars.net>)
- 3) **Cable Cars** (+441159229229)

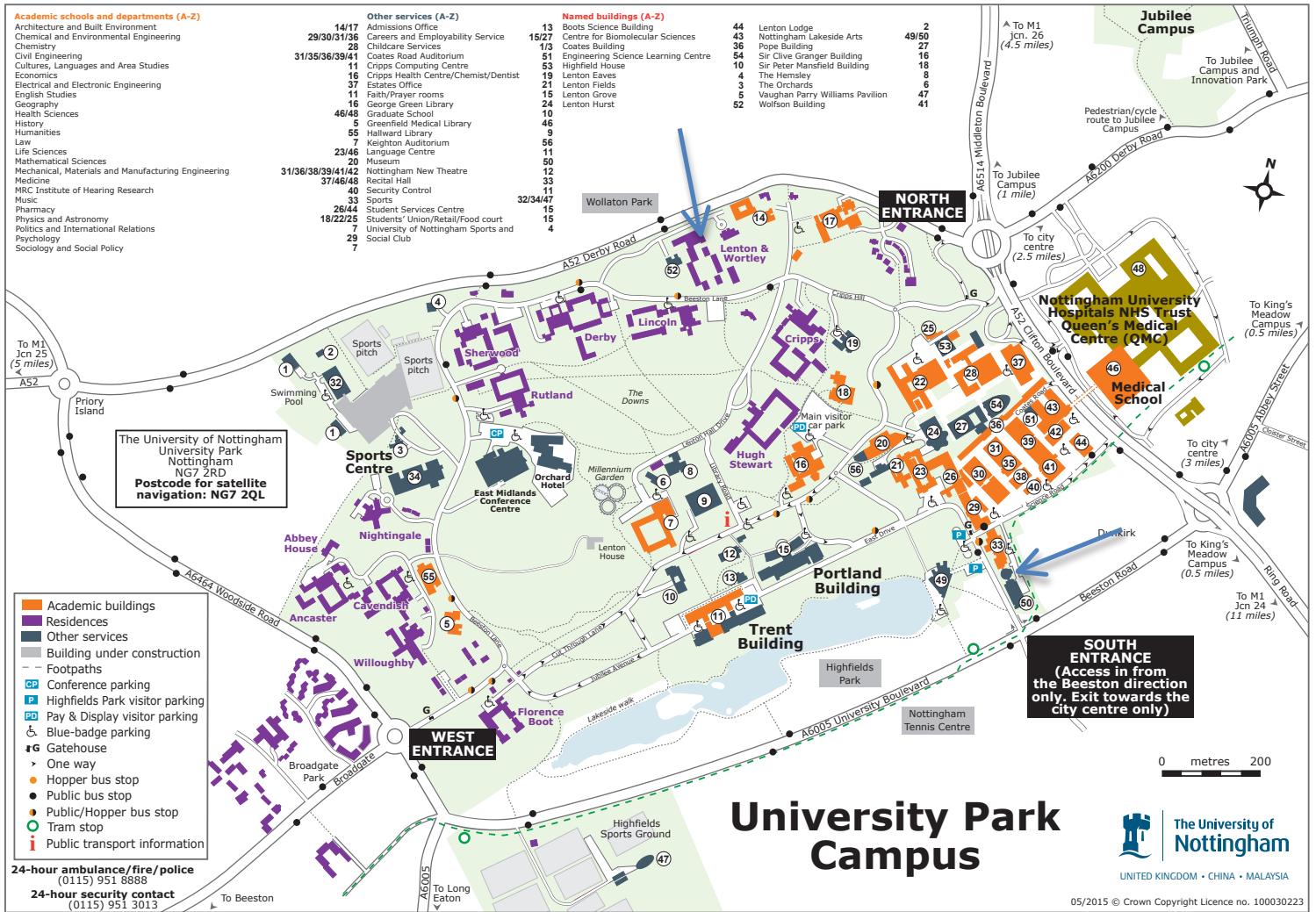
Venue

The sessions will be held in the Lecture Theatre A30 of the **Nottingham Lakeside Arts Centre** (Building 49/50) – see below for directions.

Dinner

Taxi cabs will take you to the restaurant “Larder on Goosegate” from the *Lenton and Wortley Hall* at 19:00, Thursday July 2nd.

From the Lenton and Wortley Hall to the Arts Centre



Directions:

From *Beeston Ln* take the walkway down to *Lenton Hall Drive*, pass by the *Cripps Hall* and carry on between the *Main Visitor Car Park* and the *Sir Peter Mansfield MRI Centre* (Building 18). Go towards the *Maths Sciences Building* (no 20) and head to the lake (direction *Portland Building*). Walk along *East Drive* towards the *South entrance*. You will find the *Arts centre* on your left.

Please find a larger map at:

<https://www.nottingham.ac.uk/sharedresources/documents/mapuniversitypark.pdf>

-- Quiz: do you recognize any Nobel Prize on your way? --

Academic schools and departments (A-Z)

Architecture and Built Environment
 Chemical and Environmental Engineering
 Chemistry
 Civil Engineering
 Cultures, Languages and Area Studies
 Economics
 Electrical and Electronic Engineering
 English Studies
 Geography
 Health Sciences
 History
 Humanities
 Law
 Life Sciences
 Mathematical Sciences
 Mechanical, Materials and Manufacturing Engineering
 Medicine
 MRC Institute of Hearing Research
 Music
 Pharmacy
 Physics and Astronomy
 Politics and International Relations
 Psychology
 Sociology and Social Policy

Other services (A-Z)

14/17 Admissions Office
 29/30/31/36 Careers and Employability Service
 31/35/36/38/41 Childcare Services
 11 Coates Road Auditorium
 16 Cripps Computing Centre
 16 Cripps Health Centre/Chemist/Dentist
 37 Estates Office
 11 Faith/Prayer rooms
 16 George Green Library
 46/48 Graduate School
 5 Greenfield Medical Library
 55 Hallward Library
 7 Keighton Auditorium
 23/46 Language Centre
 20 Museum
 31/36/38/39/41/42 Nottingham New Theatre
 37/46/48 Recital Hall
 40 Security Control
 33 Sports
 26/44 Student Services Centre
 18/22/25 Students' Union/Retail/Food court
 7 University of Nottingham Sports and Social Club
 7

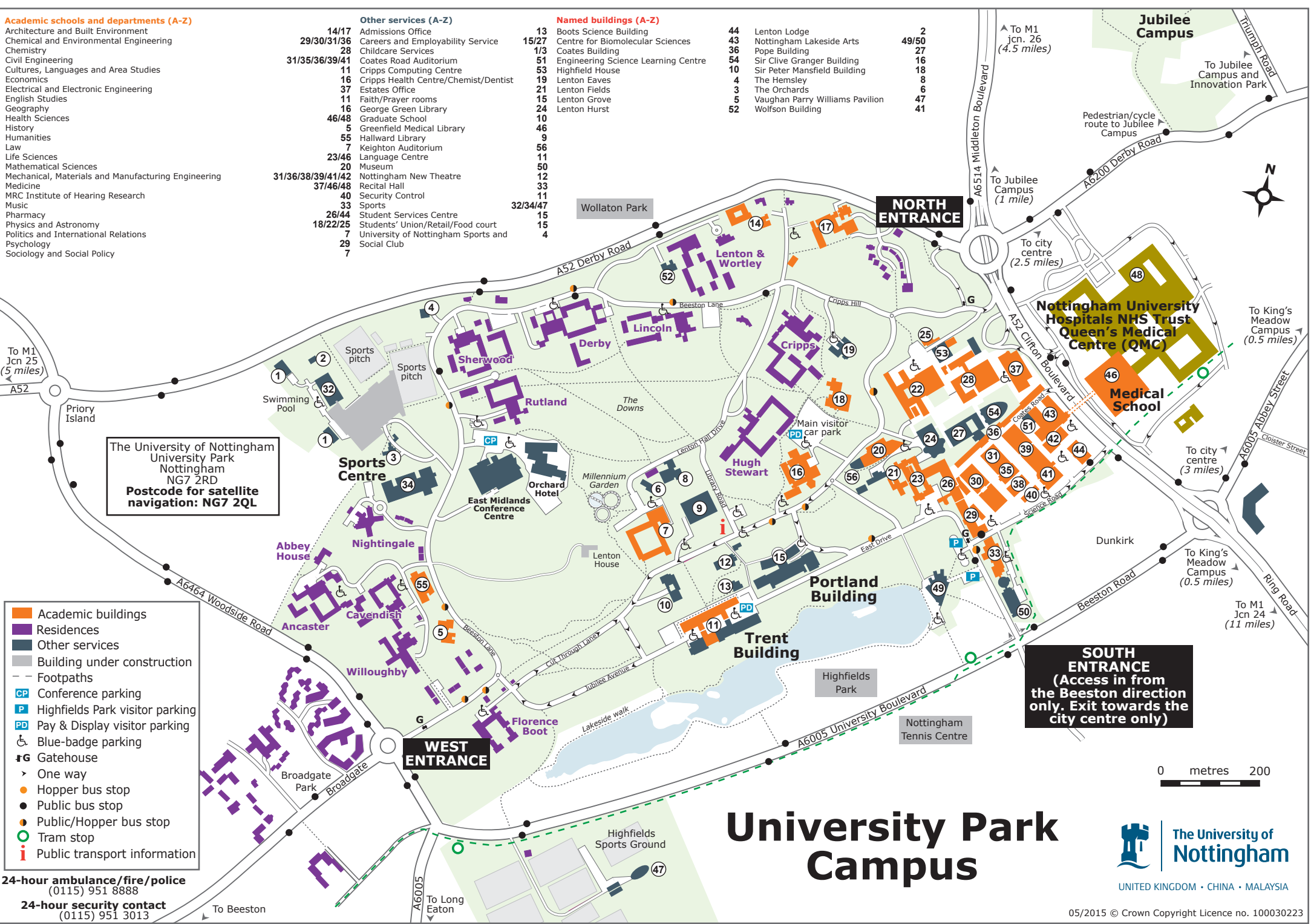
Named buildings (A-Z)

13 Boots Science Building
 15/27 Centre for Biomolecular Sciences
 1/3 Coates Building
 51 Engineering Science Learning Centre
 53 Highfield House
 19 Lenton Eaves
 21 Lenton Fields
 15 Lenton Grove
 24 Lenton Hurst
 10
 46
 9
 56
 11
 50
 12
 33
 11
 50
 12
 33
 11
 32/34/47
 15
 15
 4

44 Lenton Lodge
 43 Nottingham Lakeside Arts
 36 Pope Building
 54 Sir Clive Granger Building
 10 Sir Peter Mansfield Building
 4 The Hemsley
 3 The Orchards
 5 Vaughan Parry Williams Pavilion
 52 Wolfson Building
 2
 49/50
 27
 16
 18
 8
 6
 47
 41

- Academic buildings
- Residences
- Other services
- Building under construction
- Footpaths
- CP Conference parking
- P Highfields Park visitor parking
- PD Pay & Display visitor parking
- Blue-badge parking
- FG Gatehouse
- One way
- Hopper bus stop
- Public bus stop
- Public/Hopper bus stop
- Tram stop
- Public transport information

24-hour ambulance/fire/police
 (0115) 951 8888
24-hour security contact
 (0115) 951 3013



University Park Campus





Where do I find?

Information points

National Express Travel Centre	(K7)	1
NCT Travel Centre	(H6)	2
NET Travel Centre	(G7)	3
Nottingham Railway Station	(L8)	4
Nottingham Tourism Centre	(H7)	5

Main shopping locations

Bridlesmith Gate	(I7)	6
Intu Broadmarsh	(J7)	7
Clumber Street	(G7)	8
Cobden Chambers	(H8)	9
Derby Road	(G2, G3)	10
Exchange, The	(H7)	11
Flying Horse Mall	(H7)	12
Hockley	(H9, H10)	13
Lister Gate	(J7)	14
Intu Victoria Centre	(E7, F7)	15
Victoria Market	(F7)	16
West End Arcade	(H5)	17

Entertainment

Albert Hall	(G4)	18
Broadway Media Centre	(G9)	19
Cornerhouse, The	(F6, G6)	20
Lace Market Theatre	(H8)	21
Nottingham Arts Theatre	(H8)	22

Nottingham Playhouse	(H4)	23
Rock City/Rescue Rooms	(F4, F5)	24
TRCH - Theatre Royal and Royal Concert Hall	(G5, G6)	25
Capital FM Arena	(H10)	26

Places of interest and key attractions

Arboretum	(C3, D3)	27
Bonington Art Gallery	(E5)	28
Brewhouse Yard Museum	(K5)	29
Brian Clough statue	(H6)	30
City of Caves	(J8)	31
Galleries of Justice Museum	(J9)	32
National Ice Centre	(I10)	33
National Videogame Arcade (NVA)	(H8, H9)	34
Nottingham Castle - Museum and Art Gallery and Castle Gatehouse	(K4, J5)	35
Nottingham Contemporary	(J8)	36
Nottingham Council House/Left Lion	(H7)	37
Old Market Square	(H6)	38
Robin Hood statue	(J5)	39
Sky Mirror	(H3)	40
Sneinton Square	(G11)	41
Speakers' Corner	(H6)	42
Trinity Square	(F7)	43
Victoria Clock Tower	(E7)	44
Ye Olde Trip to Jerusalem	(K5)	45

Public offices, community centres and facilities

BBC East Midlands	(K10)	46
Citizens Advice Bureau	(L7)	47
Council House/ Nottingham Register Office	(H7)	48
Crown and County Courts	(K8)	49
Fire Station	(E6)	50
Guildhall	(F6)	51
HMRC - Inland Revenue	(M4)	52
International Community Centre	(D6)	53
Job Centre (Canal Street)	(K9)	54
Job Centre (Parliament Street)	(G5)	55
Job Centre (Station Street)	(L8)	56
Loxley House - Nottingham City Council	(L8)	57
Magistrates' Court	(L6)	58
NHS Walk In Centre (Island site)	(K11)	59
NHS Walk In Centre (Parliament St)	(G5)	60
Nottingham Central Library	(H5)	61
Nottinghamshire Archives	(L6)	62
Police - Central Station	(F6)	63
Police - Canning Circus	(G1)	64
Post Office	(G6)	65
Public Toilets (Greyhound St)	(H7)	66
The Samaritans of Nottingham	(F3)	67
Trading Standards	(E6)	68
Victoria Leisure Centre	(G11)	69
YMCA	(E7)	70

Centres of learning

Central College	(K6)	71
New College Nottingham	(H9)	72
Nottingham Trent University	(E4, E5, F5)	73

Places of worship

Central Methodist Mission	(G8)	74
Christian Centre	(F2)	75
Congregational Church	(I6)	76
Friends Meeting House	(E3)	77
Islamic Centre	(E9)	78
Nottingham Buddhist Centre	(I8)	79
St Andrew's with Castle Gate (URC)	(F5)	80
St Barnabas RC Cathedral	(G3)	81
St Mary's Church	(J9)	82
St Nicholas' Church	(J6)	83
St Peter's (and St James') Church	(I7)	84
Synagogue	(E5)	85
Unitarian Chapel	(I10)	86
William Booth Memorial Hall	(F9)	87

Transport

Bus stations

Broadmarsh	(K7)	88
Victoria	(E7)	89

Cycle Hire Points

Victoria	(E7)	90
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Train station

Nottingham Railway Station	(L8)	91
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Tram stops

Lace Market	(H8)	92
Nottingham Trent University	(E5)	93
Old Market Square	(H6)	94
Royal Centre	(G5)	95
Station Street	(L8)	96

Car parks

Arndale	(K6)	97
Broadmarsh	(K8)	98
Castle	(K7)	99
Cowan Street	(F9)	100
Curzon Street	(E9)	101
Huntingdon Street	(E8)	102
Lace Market	(H8)	103
Manvers Street	(I12)	104
Mount Street	(H4)	105
Nottingham Arena	(G10)	106
Nottingham Station	(M8)	107
Sneinton Market Square	(G12)	108
St James Street	(I5)	109
Stoney Street	(I9)	110
Talbot Street	(F4)	111
Trinity Square	(F7)	112
Upper Parliament Street	(G5)	113
Victoria Centre North	(D7)	114
Victoria Centre South	(F8)	115
Wollaton Street	(G5)	116