Job Title:	**Research Associate – SCALE project**
Reference No:	**CASA/09/06/SCALE1**
Department:	**UCL Centre for Advanced Spatial Analysis**
Reports to:	**Professor Michael Batty**
Grade:	**7 [Starting salary in the range £28,839 per annum - £31,513 per annum plus London Allowance of £2,781 per annum].**
Funding duration:	**3 years**
Closing date:	**Tuesday 7th July 2009**
Interviews:	**w/c 27th July 2009 TBC**

The SCALE project: **(**Small Changes leAd to Large Effects) Changing Energy Costs in Transport and Location Policy is an EPSRC funded research project being undertaken jointly between the UCL Centre for Advanced Spatial Analysis and UCL Centre for Transport Studies.

Commencing 1st September 2009, two Research Associate vacancies are available, one based in each department. This information pack relates to the CASA based post which focuses on land use transportation models. All researchers, plus the PhD student (who will be supervised by Shi Zhou in Computer Science) will interact with the team set up by CASA.

Project Summary

Transport and residential location consume substantial quantities of energy whilst serving only to facilitate primary economic and societal activities. The relationship between urban form and travel patterns is inherently complex: it can be influenced by policy but through many individual personal responses rather than being subject to explicit control. Managing the energy used in transport is therefore an indirect process that works by influencing the amount and distance of travel, the means by which travel takes place, and the energy requirement of the resulting travel. Achieving this effectively requires a full understanding of the many complex interacting social processes that generate the demand for travel and impinge on the ways in which it is satisfied in terms of its supply.

The complexity sciences provide a framework for organising this understanding. In this project, we argue that changes in energy costs generate surprising and unanticipated effects in complex systems such as cities, largely because of the many order effects that are generated when changes in movement and the energy utilities used to sustain locations generate multiplier effects that are hard to trace and even harder to contain. For example, as energy costs increase, people eventually reach a threshold beyond which they cannot sustain their existing travel patterns or even their locations and then rapid shifts occur in their behaviour. When energy costs reduce, these shifts are by no means symmetrical as people switch out of one activity into another, by changing location as well as mode.

At UCL, we have four groups of researchers building models of urban and transport systems which provide related perspectives on these responses to changing energy costs. Wilson pioneered the development of entropy maximising approaches to transport and location in which energy and travel costs are essential determinants of travel and his recent work in nesting these models within a dynamics that generate unanticipated effects is key to understanding the kinds of changes that are now being effected by changing energy costs. In a complementary way, these models can be provided with a much stronger rationale using recent theories of spatial agglomeration which date back to Turing but find their clearest expression in the work of Krugman (TK models). These models thus inform the Boltzman-Lotka-Volterra (BLV) models developed by Wilson. Translating these models into physical infrastructures involves explicit developments in network science and Zhou and Heydecker's models suggest ways in which energy costs might be reduced

by linking physical networks to flows generated by the BLV and TK models. What we propose here is to extend and develop these three approaches, extending our existing operational land use transport model for Greater London (built as part of the Tyndall Centre's Cities programme) to enable our partners to explore 'what if ' questions involving changing energy costs on the city.

The methodologies we will employ to explore these models involve nonlinearities that are caused by positive feedback effects in complex systems where n'th order multiplier effects are endemic. We will use phase space representations to visualise such changes and then implement these in the operational land use transport model which we will disseminate to our partners in the quest to pose significant policy questions. We intend to provide a series of tightly coupled deliverables to progress this science to the point where it is directly usable by policy makers and professionals. We will communicate our findings using various kinds of web-based services being developed under related projects. In this way, we will develop best practice based on best science. We believe that we can demonstrate the essential logic of complexity science to a much wider constituency in developing insights into these most topical questions of the changing cost of energy.

About the role

We are looking for a researcher with expertise in modelling complex systems who has good skills in programming and who could develop a suite of computer programs for the land use transportation modelling effort which will underpin one arm of SCALE. We want someone who will be able to wrestle with the science, and be able to translate this into computable forms which interface with a variety of modules and data bases. Experience in GIS would be an advantage but not essential. High level programming expertise in any suitable language C#, C++, Java etc is essential and skills in web-based solutions to running models and disseminating model results would be desirable. A fair amount of computer graphics programming is needed. It is expected that the researcher would also have knowledge of large data bases and would be involved in extending and using our London database which is integral to the project. The researcher would be involved in writing papers with the PI and Co-IS and other researchers on the project. Dependent upon qualifications the researcher might be involved in helping PhD research related to the general area of land use transport modelling.

How to Apply

To be considered for this position, please submit the following documents by the closing date:

1. a letter of application outlining your suitability to this post and your reasons for applying.
2. a CV listing education history (institution name, start and end dates of courses, qualification gained), details of membership of any professional organisations, details of current or most recent employer (name and address of current organisation, job title, salary and duties), details of previous employment and how your knowledge, skills, and abilities meet the job requirements, plus the names and addresses of two referees one of whom should be your most recent employer.
3. if relevant and possible, a sample of your work, in the form of papers, or related material which indicates your expertise and previous projects
4. In addition, UCL requires applicants applying with a CV to provide standardised monitoring information; please complete and return the last 3 pages of this document.

Please email applications to **s.curtis@ucl.ac.uk** clearly stating the post reference number in the subject line.

About CASA

The Centre for Advanced Spatial Analysis (CASA) is an initiative within University College London to develop emerging computer technologies in several disciplines which deal with geography, space, location, and the built environment. As an interdisciplinary research centre expertise is drawn from archaeology, architecture, cartography, computer science, environmental science, geography, planning, remote sensing, geomatic engineering, and transport studies. This generates a unique blend of personnel who operate from CASA and associated departments within UCL. CASA is a Department within the Faculty of the Built Environment.

For more information about CASA, please visit **http://www.casa.ucl.ac.uk**

Salary
The post is graded as Grade 7, the salary for which starts from £28,839 (excluding London Allowance of £2,781).

Probation
Appointments are subject to receipt of satisfactory references and a probationary period of 9 months.

Hours of work
This position is office-based and full time hours for research staff average 36½ hours per week.

Holidays
Annual leave is 27 working days per annum (pro-rata) for a full time member of staff.
UCL also closes for a period at Christmas and Easter, at which times staff benefit from a total of 6 'closure days' in addition to Bank Holidays.

Pension
The postholder will be eligible to join the Universities Superannuation Scheme, which is a final salary scheme with a current employee contribution rate of 6.35% and an employer contribution rate of 14% of salary.

Season ticket loans
A season ticket loan is available to staff who have successfully completed their probationary period with the facility to repay through a monthly deduction from salary.

Other benefits

Other benefits of joining UCL as a staff member are many and include:

- Access to an extensive range of in-house staff development opportunities. Staff have full use of the UCL libraries and UCL operates a Study Assistance Scheme for those undertaking part-time work-related study.

- An excellent location for transport networks being near Euston, Kings Cross and St. Pancras stations and a choice of underground stations connected to London's other mainline stations. A wide range of bus routes serves the area.

- UCL lies in Bloomsbury, just north of Oxford Street, Covent Garden and the heart of the West End with access to shops, theatres, cinemas, bars and restaurants. UCL also has its own 550 seat West End arts venue (Bloomsbury Theatre) which hosts drama, dance, music, debates and lectures during the year

- The main campus has subsidised cafeterias/bars and shops, gym, hairdresser and a travel agent. UCL staff can also benefit from corporate membership at a Tottenham Court Road gym.

Research Associate – SCALE project
(Ref CASA/09/06/SCALE1)

Job description

1. To take charge of the programming effort for the land use transportation model

2. To extend and apply the London database which will provide data for the model and to relate this to the work of the GLA Economics Research Fellow who is involved in the database development during the first year.

3. To engage in research discussion of new theories of land use and transport and specifically to consider how energy indicators and data can be integrated in such models.

4. To help prepare progress reports with the PI and Co-Is on research for funding bodies as required.

5. To contribute to the drafting and submitting of papers to appropriate peer reviewed journals.

6. To comply with the appropriate confidentiality terms regarding the disclosure of project results to third parties.

7. To participate in SCALE meetings and fulfil the project's reporting requirements, which may involve UK travel and overnight stays.

8. To prepare and present findings of research activity to colleagues and at scientific meetings.

9. To contribute to the overall activities of the research team/project collaborators and department as required.

10. To contribute to the induction and direction of other research staff and students if so requested by the Principal Investigator.

11. To carry out any other duties as are within the scope, spirit and purpose of the job as requested by the Principal Investigator.

12. At all times to follow UCL and Departmental policies including Equal Opportunities, Race Equality, Fire, Security and Health and Safety etc.

Person specification

	Essential	Desirable
1. Expertise in modelling complex systems and ability to develop a suite of computer programs related to land use transportation.	✓	
2. A postgraduate qualification in a scientifically literate area such as engineering, GIS, spatial analysis, and / or computer science		✓
3. Substantial knowledge & programming experience in any of the following programming languages: C#, C++, Java	✓	
4. Experience of building web-based model dissemination tools		✓
5. Knowledge and experience of constructing and manipulating large databases.	✓	
6. A reliable, motivated and organised person, able to manage a varied workload whilst still being able to meet strict deadlines and displaying evidence of the ability to complete tasks and projects to a high standard with a minimum of supervision.	✓	
7. A mature and confident disposition with the ability to present complex topics to a variety of audiences, and to produce and deliver dynamic presentations with ease and speed.		✓
8. Excellent written and verbal communication skills are essential to this post, as is the ability to work productively as part of a team and to produce high-quality documents, reports and publications.	✓	
9. A positive and flexible attitude with a willingness to take on new areas of application and to contribute on an equal footing to the development of the research	✓	
10. Proven ability to supervise and direct graduate students.		✓
11. A willingness to demo and present the work to stakeholders and those involved in policy application relating to land use and transport in London	✓	
12. Experience of research in the broad field of spatial analysis	✓	

APPENDIX I: Information to be provided by CV applicants

To be completed by all those submitting a CV in application for a post with University College London. Our equal opportunities policy includes the provision that in recruitment, the only consideration must be that the individual meets or is likely to meet the genuine requirements of the job. No one will be discriminated against on the basis of sex, age, race, colour, ethnic origin, physical disability, marital status, sexual orientation, caring or parental responsibilities, or belief on any matters including religion and politics.

Please complete this form in black ink/biro or by typing or an audio cassette.

Application for the Position of:	Department:
Research Associate – SCALE project	**CASA**
Ref No or Job Code: **Ref CASA/09/06/SCALE1**	

Surname:	First Name: Preferred Forename (if different):	Title:
Address:	Contact details: **work:** **home:** **email:**	

Are you 64 or over? It is UCL policy that staff normally retire on the 31st July following their 65th birthday. In line with this UCL will not normally employ someone who is within six months of that date. (see http://www.ucl.ac.uk/hr/docs/retirement.php for more information)	Yes/No
Do you require permission / a Certificate of Sponsorship to take up employment in the UK? (Immigration Asylum and Nationality Act 2006 and UK Border Agency Immigration rules – see Border Agency website http://www.ukba.homeoffice.gov.uk/workingintheuk/tier2/	Yes/No
Do you need to register under the Home Office EU Accession State Worker Registration Scheme? (See http://www.ukba.homeoffice.gov.uk/workingintheuk/eea/wrs/ for more information) Are you a Bulgarian or Romanian National? (See http://www.ukba.homeoffice.gov.uk/workingintheuk/eea/bulgariaromania/ for more information)	Yes/No
Have you any unspent criminal convictions in line with the Rehabilitation of Offenders Act 1974? If so, please specify below or on a separate sheet. Appointment to certain posts, as stated in the advertisement and job pack, is subject to a criminal record check. By signing the Declaration you accept that the organisation will seek information from the Criminal Records Bureau and any associated special lists, where we have stated it is necessary to do so.	Yes/No
Do you have a Personal Relationship with any member of staff or student at UCL? If so, please give details: See http://www.ucl.ac.uk/hr/docs/personal_relationships.php for more details	Yes/No
If employed, how many days sick leave have you had in the last 24 months?	
Where did you see this vacancy advertised?	
Current or former UCL staff/students please enter your UPI number if known:	

To the best of my knowledge the answers given to the questions contained in this application and all statements made are true and accurate. Any falsification may be considered sufficient cause for rejection or, if employed, dismissal.

Signature of Applicant.....Date.....

REHABILITATION OF OFFENDERS ACT 1974

The Rehabilitation of Offenders Act 1974 is intended to ensure that a person convicted of a criminal offence (whether in Great Britain or abroad), not involving a sentence of more than 2.5 years' imprisonment who has not since re-offended for a specified period of time (a rehabilitation period) related to the severity of their sentence is treated as if the offence, conviction and sentence had never occurred.

Sentences of more than 2.5 years put an individual concerned outside the scope of the Act. Such convictions can never therefore become spent.

(Exceptions) (Amendment) order 1986

Exempted professions NOT covered by The Rehabilitation of Offenders Act 1974 are:-

- Medical practitioner
- Barrister (in England and Wales), advocate (in Scotland), solicitor;
- Chartered accountant, certified accountant;
- Dentist, dental hygienist, dental auxiliary;
- Veterinary surgeon;
- Nurse, midwife;
- Ophthalmic optician, dispensing optician;
- Pharmaceutical chemist;
- Registered teacher (in Scotland);
- Any profession to which the Professions Supplementary to Medicine Act 1960 applies and which is undertaken following registration under the Act

Applicant Nº: _____

CONFIDENTIAL
EQUAL OPPORTUNITIES CLASSIFICATION FORM

University College London has a commitment to ensuring that staff are appointed, and promoted on the basis of merit, regardless of ethnic origin, sex or disability, sexual orientation, race, colour, nationality (within current legislation), marital status, caring or parental responsibilities, age, or beliefs on matters such as religion and politics.

Monitoring enables us to see what is happening in practice, to assess the impact of our equal opportunities policy and its implementation, to set any targets for improvements, and measure progress. To enable us to do this, and to make the exercise successful, we rely on the following details.

On receipt, this form will be separated from your application form/CV. The information provided will be treated in the strictest confidence and will only be used for the purposes of monitoring. **Thank you for your co-operation.**

Name	**Job Title/Ref. Nº Ref CASA/09/06/SCALE1**

Please complete all 5 sections:

1. Ethnic Group

A White

☐ British
☐ Irish
☐ Any other White background

B Mixed Race

☐ White and Black Caribbean
☐ White and Black African
☐ White and Asian
☐ Any other Mixed Race background

C Asian or Asian British

☐ Indian
☐ Pakistani
☐ Bangladeshi
☐ Any other Asian background

D Black or Black British

☐ Caribbean
☐ African
☐ Any other Black background

E Chinese

☐ Chinese

F Other Ethnic Group

☐ Any other background

2. Sex

☐ Male ☐ Female

3. Nationality

4. Are you disabled or do you have an impairment or medical condition?

☐ Yes
☐ No

(Examples of a 'condition' may include impairment of senses, co-ordination, memory, mobility, learning, health or well being)

5. Date of birth