

Name of Capital Programme: e-Research: e-Infrastructure	
Bid for Call: (Please tick ONE BOX ONLY, as appropriate)	
Text Mining	
<input type="checkbox"/>	Call I – Automatic Summarisation for Systematic Reviews using Text Mining
Knowledge Organisation and Semantic Services	
	Call II – Semantic Tools for Assisting the Research Lifecycles
<input type="checkbox"/>	A) Semantic tools to automate discovery and usage of research resources
<input checked="" type="checkbox"/>	B) Semantic tools to automate establishment and building research collaborations
Name of Lead Institution: I.L.R.T University of Bristol	
Name of Proposed Project: STSAR: Semantic Tools for Screen Arts Research	
Name(s) of Project Partner(s): School of Arts, Department of Drama, University of Bristol	
Full Contact Details for Primary Contact:	
<p>Name: Nicola Rogers Position: Senior Technical Researcher/Coordinator Web Futures Email: nikki.rogers@bristol.ac.uk Address: Institute for Learning and Research Technology University of Bristol 8-10 Berkeley Square Bristol BS8 1HH United Kingdom Tel: +44(0)117 9287113 (Direct), +44(0)117 9287193 (Office) Fax: +44 (0)117 928 7112</p>	
Length of Project: 18 months	
Project Start Date:	1/10/2007
Project End Date:	30/3/2009
Total Funding Requested from JISC:	
Funding Broken Down over Financial Years (Mar–Apr):	
Apr 07 – Mar 08	Apr 08 – Mar 09
£ 101,864	£ 178,303
Total Institutional Contributions: £ 105,649	
Outline Project Description:	

The STSAR project aims to produce a demonstrator based on extending the existing semantic web based tool, PARIP Explorer (<http://parip.ilt.org/>), to support screen arts (and related) research resource discovery across a range of domains. Both moving and static media will be made available through this end-user tool in order to demonstrate and test how the semantic linking of screen arts research may inspire new collaborations and facilitate the research lifecycle in this area. The demonstrator will include both an online version and a portlet version of the tool to be incorporated in an example research portal (linking with work being undertaken within the recently commenced JISC VRE Collaborative Research Events on the Web, CREW, project). Whilst being of direct benefit to this particular arts research community in the first instance, the demonstrator is expected to provide excellent generic value as an exemplar of how semantic web technology may link with e-Infrastructures to facilitate 'seamless', cross-domain knowledge and resource integration.

PARIP Explorer presents an intuitive, FOAF-like (<http://www.foaf-project.org/>) interface to the end-user for deep semantic visualisation of the connections between people (for example researchers), and practice-led research outputs (for example research papers, electronic resources, or digitised screen arts content). The PARIP Explorer tool was initially developed by Angela Piccini and the Institute for Learning and Research Technology (ILRT) for the AHRB-funded PARIP (Practice as Research in Performance, <http://www.bris.ac.uk/parip/>) project, based in the Department of Drama, University of Bristol. During this project we propose to evolve the tool using established semantic web techniques and standards to enable end-users to browse and search connections between people, online practice-led research data, and screen arts media from Grid and Grid-like systems across selected services in the academic and industry sectors. This work follows on from a successful series of e-Science workshops and a symposium under the theme of 'Locating Grid Technologies' which took place June-October 2006. These workshops brought together HE, professional and public arts sector researchers and helped focus a relevant community that will provide significant user engagement opportunities in this project.

Using standards from Semantic Grid and related technologies we aim to harvest and integrate content for PARIP Explorer's database to include:

- Moving visual media content from Watershed's D-shed (www.dshed.net/) (linking to their recently funded Thrive project which includes Bristol University Computer Science and HP Labs as partners),
- Memetic (<http://www.memetic-vre.net/>) online services, linking with the recently funded AHRC funded project to annotate Access Grid dance performance with Memetic tools supporting Choreographic Research,
- A range of informal and also formal content from JISC IE services, Arts-specific online services, Bristol University systems and other.

The results of connecting such wide-ranging but related forms of media in this context are expected to benefit researchers in a few key ways. Citation becomes possible in a new way through this tool in terms of giving the end-user semantic views of the relationships between screen arts performance and genealogies for practice-led research media. Users are newly presented with opportunities to discover and visualise the relationships between researchers and their outputs, to observe themes in a digital context, and therefore to realise new research collaborations across both academia and industry; resources spanning several sectors will be integrated and intuitively presented by the proposed tool development.

The PARIP Explorer user interface currently presents both a textual view and a graphical view of its database. The graphical view (based on the highly visual FOAF viewer type of application) is considered particularly appropriate to extend in this context so as to represent semantic relationships between resources such as people, research projects, research groups, location, textual research outputs, static images and digitised screen art – moving images. In this aspect the project is fully distinct from the CREW VRE project for example, which seeks to develop a textual (non-graphical) semantic view of data, and according to the faceted browse paradigm.

Currently PARIP Explorer cannot display moving images to the end-user and we propose to

Appropriateness and Fit to Programme Objectives and Overall Value to the JISC Community

Project outline

PARIP Explorer (<http://parip.ilrt.org/>) is a semantic web application that has been created for arts research. Initially developed by the Institute for Learning and Research Technology (ILRT) and the Department of Drama: Theatre, Film, Television, University of Bristol, it links diverse but related entities for easy, intuitive searching and browsing of performing and screen arts information. However, it currently presents only textual content. This project will extend PARIP Explorer to provide access to annotated digital moving image media, via enhanced search-and-browse interfaces. By contextualising and increasing the 'findability' of media, it will facilitate multiple re-uses in new work. In terms of the subject domain, the project is associated with the University of Bristol research theme, 'Performativity, Place, Space', led by Professor Martin White.

A key question for practice-led research communities has been how visibly, yet non-textually, to articulate references within and between works: themes, genres, production practices, technologies, research questions, and so on. Through this project PARIP Explorer will present new visualisations of screen arts citation. That is, narrative, screen grammar, production history, technologies, themes and so on will be annotated and made visible to users through meaningful connections linked to the media themselves. This project aims to engage users in knowledge-mapping activities to produce for the first time media-based genealogies of practice-led research.

The project will work with dShed, Watershed Media Centre (Bristol). With over 500 individuals, groups and organisations represented, dShed is a highly significant store of digital screen media. However, dShed content is currently presented through discrete web applications with basic searching functionality. PARIP Explorer offers the opportunity to visualise the spatial contexts of, for example, tracking shots or transitions, or the working relationships between artists and locations. These metadata models will be tested with the digital artists themselves.

Content will be selected from dShed, the digital arts wing of project partner, Watershed Media Centre (Bristol). 129 not-for-profit organisations, 65 schools, colleges and universities, 61 companies and 270 individuals have contributed material to dShed. During 90 Second Challenge, which invited Bristol people to make and submit short films, a constant stream was uploaded over a year and over 140 films are now online. However, that data is currently held in a single server application and is presented for view via the dShed.net website. With 12gb of data held on the website alone and with terrabytes of information in their archive servers, dShed is a highly significant data store of digitised moving image content. This project therefore proposes to innovate in the area of annotating and organising dShed media for presentation via an extended PARIP Explorer. Other data to be included in PARIP Explorer will be derived from online records of projects, researchers, related informal material such as blog entries and so on, from remote content located in several online services to be derived in consultation with the user stakeholder group.

The Drama department will oversee the development of quality data acquisition practices in terms of content selection and metadata capture ranging from the use of ontologies and metadata schemas through to the informal 'tagging' of resources. The project has also secured an agreement to work with Manchester University and Helen Bailey on their recently funded project which will record and annotate dance performance via Memetic (<http://www.memetic-vre.net/>) software. The technical team at ILRT already has a close working relationship with the Memetic team both historically through its early work attempting

to link PARIP Explorer to Memetic servers in 2006¹ and currently through its collaboration with Manchester University among other partners on the JISC VRE CREW project.

Call Relevance

This project proposes to evolve the existing Semantic Web-based PARIP Explorer tool into a semantics-aware application that can generally harvest and acquire data from a range of online, Grid and P2P services relevant to the screen arts researcher community. The resulting demonstrator will semantically analyse and cross-map its metadata about researchers, research project outputs, annotated Access Grid recordings, screen arts media and other digital content drawn from relevant services across Bristol University and the JISC IE. Thus it will provide an intuitive browse and search interface to a range of media to include links to moving image content as well as textual resources. Access to this range of online content is not currently possible via PARIP Explorer.

The resulting software tool is intended to support workflows for arts researchers by enabling them to search, browse, access and view content normally not fully accessible in an online environment (for example, from within this single system, users may discover and view screen arts media excerpts related to specific themes from across multiple Grid or P2P systems). It is anticipated that this will promote the reuse of content in further works plus inspire collaborations among researchers from across the public and private sectors who might otherwise not have realised their collective co-location in an online research space. The interlinking of resources as described will also address the particular current problem of citation for screen arts outlined above.

In addition, end-users will be able to annotate resources referenced in the PARIP Explorer database. This is expected to promote quality knowledge sharing amongst virtual organisations of connected users and represents a social software aspect to the project. We will also explore access rights issues and how this may support virtual organisation usage of a PARIP Explorer system (for example a user's login credentials may or may not allow them to view annotations entered by other users in the system). Best practice standards for the embedding of licensing (such as Creative Commons) will be employed in respect of content to be made available through the demonstrator.

The proposed partnership between the University of Bristol and the Watershed Media Centre (Bristol) should allow opportunities to test whether knowledge exchange between users of the proposed system from across private and public sectors is facilitated by the envisaged tool development. Workflows concerning automated (or otherwise) metadata acquisition will be examined for the project and approaches to harvesting data from a range of services to PARIP Explorer will be implemented and evaluated for ease of administration, interoperability and sustainability.

The proposed project meets the requirements for Call Area B in some specific ways:

- It builds upon existing semantic technology research by extending the current version of the PARIP Explorer semantic web application, linking it to Memetic servers in a Semantic Grid context, and by using Semantic Web standards such as OWL (Web Ontology Language) and SKOS (Simple Knowledge Organisation Systems) for the aggregation and cross-mapping of metadata in PARIP Explorer's internal system. The project team include specialists with significant experience in using semantic web technologies.
- It builds upon work with existing JISC programmes such as the Virtual Research Environment programme by linking with complementary but distinct work being undertaken in the CREW project. It builds upon previous work funded under the AHRC-EP SRC-JISC Arts and Humanities e-Science Initiative (see appendix 1) and current work being funded under the same initiative to develop Memetic annotation

¹ This took place during a series of e-Science workshops and a symposium under the theme of 'Locating Grid Technologies' which took place June-October 2006. See also Appendix

for dance and creative arts performance. Work will also be undertaken to explore linking PARIP Explorer to related Mimas data sets and resources in the JISC Information Environment, liaising with relevant projects as appropriate.

- By linking with the aforementioned CREW project, this project has the opportunity to test and report on the integration of a portlet interface to PARIP Explorer within an institutional research portal or VRE.
- The drama department have cultivated excellent links with the active research community around screen arts and this presents valuable opportunities for the project to undertake successful requirements gathering and usability testing (see also Appendix 1 regarding previous community engagement activities relevant to this project).
- Data and information modelling issues are considered in detail within this project especially with a view to mapping vocabularies for, for example, research papers, electronic resources, or digitised screen arts content alongside informal vocabularies arising from the community 'tagging' of resources. Creative Commons and other appropriate licensing standards and legal issues are also considered.
- A cross-disciplinary team collaborates on this project, spanning the HE and private sectors and computer scientists and researchers.
- Workflows supportive of the research lifecycle in this project's context are also considered as described above.
- Sustainability beyond the project's end is considered in later sections of this document.

Innovation

This proposed project innovates in a number of ways:

In terms of technical innovation it builds upon the existing semantic technology based tool, PARIP Explorer, extending it from holding only textual based information to including links to online content as well as moving image content from a range of distributed services. Furthermore that moving image content will be annotated for semantic search and retrieval. The full integration of the range of content proposed will be managed by SKOS based cross-mapping techniques and semantic inferencing. Data mining expertise via the named ILRT researcher (Simon Price) will also be brought to the project as appropriate. Data modelling will be considered throughout and also both automated and hands-on metadata generation. It will include modelling of the spatial and temporal relationships that are at the heart of creative and performing arts research practices.

The anticipated stakeholder groups include creative and performing arts and media researchers. The project will seek to annotate aspects of Bristol's Live Art archive, Arnolfini archive and Watershed's D-shed archives for inclusion as metadata in the PARIP Explorer database. Through formative evaluation of the use of the PARIP Explorer demonstrator via engagement with the stakeholder groups this project defines, innovation in the area of screen arts research, such as citation, virtual organisation access to resources, the discovery of new researcher collaboration opportunities, and support for the peer review process may be realised.

The project will also innovate in the area of Creative Commons (CC) open source licensing within a higher education context. CC licensing allows content creators to define the conditions in which their copyrighted works can be used and facilitates subsequent re-purposing by embedding this information in the media via the same resource description framework (RDF) format used by PARIP Explorer. Freely available CC licences will allow the project to model new approaches to IPR and copyright for the creative industries.

Overall value to the JISC Community

The open source software this project will deliver should allow researchers to find, extract and re-purpose digital screen media for future research, including practice-led research. The anticipated benefits of this for researchers are described in earlier sections.

We anticipate generic value in the approach taken in this project to integrate such a range of online content and we expect it to scale to other communities besides the screen arts – including researcher communities who are increasingly using tagging, moving media content, and need tools to observe the semantic connections between disparate resources stored online or in grid services.

We expect this project to contribute to policies and procedures regarding successful data acquisition techniques towards semantic integration services. The evaluation of copyright and intellectual property issues arising from public/private sector, industry/academic collaborative environments will be reported on.

Experience and lessons learned from the project’s efforts to integrate the demonstrator in a VRE context will also be reported on for the benefit of the JISC community.

Project Plan

Workplan (also included in Appendix 3):

PROJECT WORKPLAN	Oct-07	Nov-07	Dec-07	Jan-08	Feb-08	Mar-08	Apr-08	May-08	Jun-08	Jul-08	Aug-08	Sep-08	Oct-08	Nov-08	Dec-08	Jan-09	Feb-09	Mar-09
User engagement																		
Develop scenarios and use cases																		
User engagement																		
Evaluate legal issues surrounding content and licensing																		
Define requirements resulting from assessing legal issues																		
Demonstrator																		
Install PARIP Explorer system for use																		
Architecture report																		
Develop data harvesting from Dshed																		
Develop data harvesting from Memetic servers																		
Develop data harvesting from other services e.g. in JISC IE																		
Data modelling (metadata vocabularies and cross-mapping)																		
Develop PARIP Explorer user interface																		
Develop annotations feature (social software aspect)																		
Develop security model																		
Develop support for including creative commons metadata																		
Software testing and bug fixing																		
Demonstrator Evaluation																		
Usability testing (formative evaluation)																		
Embedding																		
Development of portlet user interface, VRE integration																		
Final reporting																		
Lessons learned, findings of value to JISC community																		

Deliverables:

D1 Report on User Engagement and the Stakeholder community: This project aims to engage users in knowledge-mapping activities to produce for the first time media-based genealogies of practice-led research. Scenarios and use cases for the project will be described along with requirements resulting from the assessment of legal issues around copyright and so on.

D2 Public email list and project web site tailored to the stakeholder community identified.

D3 Review report of existing practices and technologies used for screen arts media databases (for example data modelling in similar/related domains and projects, including licensing metadata, techniques for the integration of hybrid approaches to formal and informal vocabularies - namely semantic web ontologies integrated with community tagging vocabularies).

D4 Framework specification document, specifying the technical framework for the proposed system (to include an evaluation of options for semantic query resolution distributed across P2P systems versus alternatives, and resource retrieval in the Semantic Grid)

D5. Detailed technical workplan. This will specify several aspects as listed in the workplan above.

D6 Demonstrator online PARIP Explorer system - extended to enable the search and browse of external Grid and Grid-like data sources for the visualisation of screen-based arts media in context, and based on the framework specification deliverable report as far as possible.

D7 Evaluation report documenting the usability testing of the demonstrator and findings from the project's formative evaluation. This will in particular evaluate to what extent the demonstrator facilitates the research lifecycle in this area and promotes the discovery and creation of new communities of research collaborators.

D8 Sustainability report, covering options for embedding and maintaining the open source PARIP Explorer demonstrator in virtual research environments for example. This will include a report on workflows for the demonstrator, for example where supporting data acquisition procedures relevant to the range of personnel directly or indirectly involved in administering the demonstrator system. Related issues such as licensing concerns will also be discussed.

D9. Final project report covering the demonstrator system design, evaluation and lessons learnt. Also documenting the potential for other research-enhancing applications - such as screen arrangement manipulation tools - to be integrated with, or layered over, PARIP Explorer.

D10 Any other reports as required by stakeholders.

Project Management Arrangements

The project will be managed and administered by Nikki Rogers based at the I.L.R.T, University of Bristol. This role will have responsibility for coordinating the community and user engagement aspects of the project – to be managed by Angela Piccini from the Drama department at the University of Bristol – together with the technical management of the project – which will be undertaken by Jasper Tredgold who is also based at the I.L.R.T. This project management role will in general provide strategic direction to the project, monitor project activities, produce JISC progress and final reports and undertake any remedial action required in the event of project slippage or the occurrence of other risks. Jasper Tredgold in his capacity as Technical Manager for the project will manage technical work across the project technical partners (namely the Watershed Media Centre and the I.L.R.T). Please note that Jasper Tredgold will be part technical manager (0.3FTE) and part technical researcher (0.5FTE) on this project.

Risks

Risk	Probability (1-5)	Severity (1-5)	Score (PxS)	Action to Prevent/Manage Risk
Staffing	2	4	8	Expertise is spread across individuals in two departments at Bristol University and also at the Watershed Media Centre. Bristol University and Watershed offer a pool of staff with suitably equivalent skills in the event of any staff departures occurring on the project.
Organisational	4	1	4	To cope with the three-way collaboration described above, project management arrangements have been made in order to facilitate across departments and institutions with support for both technical and user/community engagement goals in

				mind. Previous successful collaboration between the parties involved (escience workshop series 2006 – see appendix 1) and existing experience of such inter-organisational collaborations (for example the Thrive project) should bring to bear on this project.
Technical	3	3	9	The range of semantic web, semantic grid and web services technologies involved are challenging. However, the collaborating groups involved are experts in these areas.
Legal	3	3	9	Legal issues are relevant in terms of the copyrighted data that becomes searchable via the demonstrators to be produced for the project. These issues are being tackled explicitly in terms of access control to and the provision of creative commons licensing data for the resources accessible via the demonstrator.
User stakeholders	2	3	6	The budget includes provision for user engagement and a community of user stakeholders has been engaged and maintained through the e-science workshop series of 2006 and subsequent activity relating to research in the University of Bristol drama department.

IPR Position

All software and tools developed as part of this project will be made available on an open source basis to the UK HE and FE community, with a license permitting their free non-commercial use and development.

Sustainability Issues

Ongoing advice will be sought from the Arts and Humanities e-Science Support Centre. The following should also be noted, as the dynamic nature of some of PARIP Explorer's data presents challenges for discussion and exploration. PARIP Explorer can be described as an online database of information with details of arts researchers, their universities, their projects and so on. In this project we will develop it to link to audio/visual material from the Watershed's dShed project as well as Access Grid performance recordings held at the University of Bristol and semantically annotated performances held in a Memetic server at Manchester University for example. Some of the information to be displayed in the PARIP Explorer database will therefore be stored elsewhere (i.e. on the internet and in Grid or P2P networks). Therefore, whilst some PARIP Explorer data will be internal to the system and developed on an ongoing basis, over time some 'links' could go stale and we do not claim we will replicate huge stores of audio/visual data files from external locations to preserve access to data.

Sustainable options for access to the PARIP Explorer demonstrator will be further explored as part of the project's exit strategy, to include options for the automated upload of audio-visual and also annotations data to PARIP Explorer. We will make available reports and guidance describing to PARIP Explorer users how best to annotate, upload and use its information.

The software will be designed with re-usability in mind. Sustainability and extensibility (of both the software and its data models) are important considerations here. Software outputs will be made available via appropriate channels (for example via Sourceforge) under an Open Source license. We will establish a public Open Source project to distribute them, and to house any further development. Suitable documentation will be provided to promote reuse and the embedding of the electronic outputs in other and related contexts. This might mean the embedding of multiple instances of the advanced PARIP Explorer application across a large-scale P2P system, or view layer interfaces in institutional VRE's, however our recommended approach for this will depend on the architectural review conducted earlier in the project / the framework model for the demonstrator. For the overall sustainability of the project's demonstrator PARIP Explorer system, we will also review further funded development options as appropriate and in liaison with the project partners.

Engagement with the Community

The project stakeholders discussed in earlier sections (please also see prior work relevant to this project cited in Appendix 1) will be engaged throughout the project and coordinated via the Drama department at the University of Bristol. User engagement is described in the workplan above, please also see Appendix 3. The project will work in partnership with the JISC towards dissemination and evaluation activities and make available the project outputs beyond the JISC funding period (please see the previous section on sustainability).

JISC STSAR BUDGET

	Oct 07- Mar 08	Apr 08- Mar 09	TOTAL £
Directly Incurred			
Mr Simon Price [REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
Mr Jasper Tredgold, [REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
Total Directly Incurred Staff (A)	63,491	99,673	163,164
Non-Staff	Oct 07- Mar 08	Apr 08- Mar 09	TOTAL £
Travel and expenses (@ £150 per trip)	900	1,842	2,742
Access Grid Node costs	500	1,023	1,523
Office Costs (@ £1K per FTE per year)	1,000	2,070	3,070
Total Directly Incurred Non-Staff (B)	2,400	4,935	7,335
Directly Incurred Total (A+B=C) (C)	65,891	104,608	170,499
Directly Allocated	Oct 07- Mar 08	Apr 08- Mar 09	TOTAL £
Estates	5,617	11,507	17,124
Directly Allocated Total (D)	5,617	11,507 0	17,124
Indirect	Oct 07- Mar 08	Apr 08- Mar 09	TOTAL £
Mr Simon Price	[REDACTED]	[REDACTED]	[REDACTED]
Mr Jasper Tredgold	[REDACTED]	[REDACTED]	[REDACTED]
Indirect Costs (E)	30,357	62,187	92,544
Total Project Cost (C+D+E)	101,864	178,303	280,167
Amount Requested from JISC	101,864	178,303	280,167
Institutional Contributions (see below)	36,793	68,856	105,649
Total cost of project	138,658	247,158 0	385,816
Percentage Contributions over the life of the project	JISC	Partners	Total
	73%	27%	100%

Institutional Contribution

	Oct 07- Mar 08	Apr 08- Mar 09	TOTAL £
Directly Incurred			
Dr Nikki Rogers, [REDACTED], 5 hours per week	[REDACTED]	[REDACTED]	[REDACTED]
Dr Angela Piccini, [REDACTED], 5 hours per week	[REDACTED]	[REDACTED]	[REDACTED]
Ms Ruth Dawson, ILRT Technical Officer, 0.1 FTE	[REDACTED]	[REDACTED]	[REDACTED]
Mrs Tam Lewis, ILRT Senior Finance Assistant, 0.1 FTE	[REDACTED]	[REDACTED]	[REDACTED]
Watershed Staff time: Project work:access, rights, meetings, research	[REDACTED]	[REDACTED]	[REDACTED]
Total Directly Incurred Staff (A)	24,267	43,357 0	67,624

Non-Staff	Oct 07- Mar 08	Apr 08- Mar 09	TOTAL £
Watershed Equipment/materials - Access to dshed content, clearances and copyright	3,333	6,667	10,000
Total Directly Incurred Non-Staff (B)	3,333	6,667	10,000
Directly Incurred Total (A+B=C) (C)	27,601	50,023	77,624
Directly Allocated	Oct 07- Mar 08	Apr 08- Mar 09	TOTAL £
Estates	1,435	2,940	4,375
Directly Allocated Total (D)	1,435	2,940	4,375
Indirect	Oct 07- Mar 08	Apr 08- Mar 09	
Rogers, Piccini, Dawson, Lewis	7,758	15,892	23,650
Indirect Costs (E)	7,758	15,892	23,650
Total Project Cost (C+D+E)	36,793	68,856	105,649

Previous Experience of the Project Team

Simon Price is a senior technical researcher in the Internet Development group at the Institute for Learning and Research Technology and a Semantic Web researcher in the Machine Learning group at the University of Bristol. He was the primary developer of PARIP Explorer, a pilot social network search engine and visualisation tool. His main research interest is automated data fusion: merging references to people and their works - both on the Web and in traditional relational databases. Before joining the university in 1992, Simon worked for eight years as a programmer in the computer games industry. At Bristol he led technical development of a multi-award winning eLearning application - the largest of its type in the World. He has since worked on standards-based Web applications and highly successful national services for the university and various academic consortia. As a consultant developer he has worked for over 30 public and private organisations around the World

Jasper Tredgold is a Senior Technical Researcher at the Institute for Learning and Research Technology at the University of Bristol. He has many years experience of working on the technical aspects of HE-based software. Of particular relevance is his experience of Java web application and portlet development (JISC Subject Portals Project), Semantic Web technologies (JISC VRE IUGO project), and Shibboleth (JISC Shibboleth-aware Portals and Information Environments Project. He is currently the technical lead for the University of Bristol's Shibboleth service implementation project). Jasper is also currently studying for an MSc in Software Development.

Dr Angela Piccini is a Research Councils Academic Fellow based in the Drama Department at the University of Bristol. Between June and October 2006 she was principle investigator on an AHRC e-Science Workshop grant to run events that explored the limits and potential of Grid technologies in practice-led performance and screen research (see also appendix 1).

Nikki Rogers is a Senior Technical Researcher and Coordinator of the Web Futures at the Institute for Learning and Research Technology at the University of Bristol. She has several years' experience in developing with semantic web technologies including project work for the JISC IE Metadata Schema Registry (IEMSR) project and the SWAD-E (European Semantic

Web) project. She is currently Technical Manager for the recently funded JISC VRE CREW project.

Experienced personnel from dShed, the digital arts wing of project partner, Watershed Media Centre, will also provide technical and non-technical support in-kind.

Appendix 1

From June-October 2006 a series ('Locating Grid Technologies') of e-Science workshops and one symposium were held to introduce performing and creative arts and media researchers to the e-Science agenda and its associated tools and technologies in order to identify research activity potential in both the arts and technical research areas.

In association with the University of Bristol Research theme Performativity | Place | Space (<http://www.bris.ac.uk/arts/birtha/themes/performativity.html>) the workshops explored fragmentations of space-time in networked environments by: using the communications grid (InSORS Grid) as a telematic performance environment and as a dissemination tool for other performance forms; using a range of software interfaces within communications grid events to record, annotate and retrieve 'meetings' (Memetic and PARIP Explorer); using Semantic Web to query that audio-visual archive in such a way as to facilitate its creative re-use in performance, in programmed installation environments and in virtual working environments. Although the workshops were an ambitious undertaking, the unique combination of tools and technologies was necessary in the context of the arts research potential and through this combined work we identified many areas for future development.

Appendix 2

Image from the PARIP Explorer tool showing graphical 'Map view' of related entities in the database. Users are also able to switch to the corresponding 'Text View' of the same data.



