

# Ideopolis: Knowledge City Region

Cambridge Case Study



***“A low risk place to do a high risk thing”***

Andy Richards, “serial” biotech entrepreneur, and Cambridge investor



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## Cambridge Case Study

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## Cambridge Case Study

### Executive Summary

Cambridge is a city with a considerable proportion of knowledge businesses and a highly educated population doing highly skilled jobs. It has developed a style of networking and consultancy that has allowed it to take advantage of the research base provided by the university. However, the city's future success depends on how it manages the consequences of success: high house prices, traffic congestion and business relocations present significant challenges to the city.

### Ideopolis driver analysis: strengths, challenges and opportunities

- **Physical knowledge city:** Cambridge has a number of high quality science parks on the city outskirts that have accommodated business growth and attracted new firms. However, the historic city centre constrains development, and house prices are high.
- **Building on what's there:** Cambridge has used its traditional academic strength to compete in the knowledge economy. Cambridge has seen considerable spin-off activity within a range of high-tech firms.
- **Diverse specialisation:** The driver of growth in Cambridge has been specialisation in a variety of niche, high-tech industries.
- **High skill organisations:** Cambridge produces jobs for scientists and personal service staff. However, it is less good at providing jobs in the middle, leading to concerns about a polarised labour market.
- **Vibrant education sector:** Cambridge University makes a huge contribution to and plays a significant role in the city.
- **Distinctive knowledge city offer:** Cambridge has an international reputation, and a distinctive business offering. A challenge here is the rise of companies that are seen to 'piggy-back' off the reputation of the university.
- **Leveraging strong connectivity:** The city is well linked to London and internationally. Economic success is leading to congestion in the centre though, and there are concerns that the governance structures do not serve the city's connectivity well.
- **Leadership around a knowledge city vision:** The city knows where it is going, although it lacks the institutions to deal effectively with economic growth.
- **Investing in communities:** Cambridge has good public services and an affluent population, but it needs to find ways to spread the wealth.

### Policy recommendations

- Provide soft infrastructure in the new growth areas.
- Local authorities need to work better together: for example, to reduce traffic congestion by investment in public transport.

### Lessons for other cities

- **Growth is a social phenomenon.** Cambridge has developed, in large part, because of the networks between groups of consultants, entrepreneurs and scientists. Realising it was in their interest to collaborate; they did, without state intervention.
- **Build on what's there.** Cambridge has a high-quality research university, and it has built on this to create economic success.

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### 1. Introduction

Cambridge has developed rapidly from a market town with a university to a dynamic hub of high-tech economic growth. It is highly knowledge intensive, and has developed an entrepreneurial culture specialising in the development and sale of high technology start-ups, which it often sells abroad. The future depends on the local governance framework

and its ability to manage and accommodate growth. Cambridge must also achieve the successful transition of the business model from one selling innovation to one exploiting it. It is undoubtedly a secondary Ideopolis, but as a relatively small city without a 'city-region'<sup>1</sup>, Cambridge is not an Ideopolis.

#### **Defining 'Ideopolis' and 'Secondary Ideopolis'**

The Ideopolis is the vision of a sustainable knowledge intensive city that drives growth in the wider city-region. It gives cities a framework for developing knowledge-intensive industries that will be economically successful and improve quality of life.

Some cities are not the main drivers of growth in their city-region, and so cannot become Ideopolises. They can, however, use the Ideopolis framework to become Secondary Ideopolises' or "Knowledge Cities" that link closely with an Ideopolis.

#### **About the Ideopolis project**

The Work Foundation conducted a year-long research project looking at the concept of the Ideopolis – a sustainable knowledge city that drives growth in the wider city-region. Based on literature reviews, data analysis and UK and international case studies, the research highlights nine drivers of an Ideopolis. This case study forms part of the evidence base for the project. It uses the Ideopolis framework and nine drivers to assess to what extent the city is an Ideopolis and what challenges the city faces in the future if it is to be economically successful and sustainable in a knowledge economy.

#### **About this case study**

Presenting findings from interviews with a range of stakeholders as well as literature review work, this case study analyses Cambridge using the Ideopolis framework to assess where the city is on the 'Ideopolis trajectory'. It is organised into the following sections:

- Brief history of Cambridge
- Cambridge now
- Cambridge: knowledge city?
- Ideopolis driver analysis: strengths, challenges & opportunities
- Conclusions
- Policy recommendations
- Lessons learned from Cambridge

<sup>1</sup> Indeed, in terms of some economic activity, Cambridge operates within the London city-region.

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### 2. Brief History of Cambridge

Cambridge was first settled by the Romans as a crossing over the river Cam. It developed as the site of a castle, and the university was established around 1200. This development is undoubtedly the single most important event in the history of Cambridge. The oldest college, Peterhouse, was founded in 1284. The city expanded gradually, with no great change, until the twentieth century.

The second half of the twentieth century saw three linked processes that changed the shape of the city as it is now. The first was the expansion of the university, notably begun after the 1950s with the full admission of women. Accompanied by increased research activity and its continuing place as one of the best universities in the world, this helped provide a critical mass for economic change.

The second factor was economic growth, often called the 'Cambridge Phenomenon'. This saw a highly successful high-tech entrepreneurial business model develop in the area, and spawned a series of important businesses that were often sold abroad. The model was social in as much as it was economic, and relied on the networks between consultants, businessmen and scientists.

A third, related factor was a changing climate of attitudes towards the development of the area, leading to an increased acceptance of growth. Physically, this, and the economic success, was expressed through the proliferation of business parks around the fringes of the city, and some physical development in the city centre, which was seen as being of high quality and attractive to incoming and growing firms.

### 3. Cambridge Now

Cambridge is a small historic town coping with knowledge-intensive growth, predominantly driven by the private sector, and quality of life tensions associated with such growth. Like other cities, Cambridge also experiences the strains of local authority boundaries not reflecting economic or social activity

Table 1 (on the next page) presents some top line statistics about Cambridge's labour market. The population of Cambridge is highly skilled. Of the percentage of working age, 48% are educated to NVQ level 4 and above, against the national average of 25%. It is also highly professional, with some evidence of an 'hourglass' labour market<sup>2</sup> emerging. Almost 27% of the population work in professional jobs, compared to around 13% nationally and 12% in the region. It compensates for this by having low proportions working in mid-level jobs: personal service, sales and customer service, process plant and machine.

Commuting patterns shape the city. Its proximity to London means some people from within the city commute to London, with some new developments in the city being directly marketed for commuters. There are also commuters from nearby towns and villages, as the city is unable to provide sufficient housing for its entire workforce. Some towns such as Ely have become satellites of Cambridge, and the character of nearby villages is now dominated by in-commuters.

Cambridge has two universities: the University of Cambridge and Anglia Ruskin University. Cambridge University, the larger of the two, is a major employer and dominates the town. Around 25% of the population aged 16-74 are in full time education. And the university also dominates perceptions of the city and the built environment, with attractive colleges located in the city centre.

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<sup>2</sup> The 'hour-glass' labour market is where there more jobs at the top and bottom of the labour market but a hollowing out of jobs in the middle.

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**Table 1 – Cambridge’s labour market (all statistics from NOMIS)**

	<b>Cambridge</b>	<b>Eastern</b>	<b>GB</b>
General (Source: Midyear Population Estimates, 2004 and Annual population survey, April 2004 - March 2005)			
Population	118,500	5,491,000	58,124,600
Working age population	72.4%	3,344,200	36,037,300
Economically active	78.6%	81.6%	78.3%
Economically inactive (all)	21.4%	18.4%	21.7%
Economically inactive (wanting a job)	0.9%	4.2%	5.2%
Skills (Source: Local Area Labour Force Survey (March 2003 - February 2004)			
NVQ4 and above	47.8%	23.2%	25.2%
NVQ3 and above	60.3%	40.5%	43.1%
NVQ2 and above	73.2%	61.1%	61.5%
NVQ1 and above	83.5%	77.1%	76.0%
Other qualifications	8.7%	8.2%	8.8%
No qualifications	7.8%	14.8%	15.1%
Occupations (Annual population survey, April 2004 - March 2005)			
Manager and senior officials	13.9%	16.0%	14.9%
Professional	26.6%	11.7%	12.6%
Associate professional and technical	15.7%	13.8%	14.0%
Admin and secretarial	10.1%	12.4%	12.6%
Skilled trades	7.9%	11.7%	11.2%
Personal services	3.2%	7.5%	7.7%
Sales and customer service	5.7%	7.2%	7.8%
Process plant and machine	—	7.0%	7.5%
Elementary	12.7%	11.5%	11.5%
Businesses (Source: VAT registrations / de-registrations by industry, 2004)			
VAT registrations	9.3%	9.6%	10.1%
VAT de-registrations	8.6%	9.5%	9.9%

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### 4. Cambridge: Knowledge City?

#### Measures of Knowledge Intensity

One of the key outputs of the Ideopolis project is the contribution to discussions around how to measure knowledge intensity. Knowledge intensity is too often restricted to the OECD definition of knowledge intensive businesses. The Ideopolis project argues that knowledge intensity should be assessed based on knowledge-intensive occupations and knowledge intensive industries (which should include education and health, as well as all creative and cultural industries). We have developed four measures of assessing knowledge intensity for cities; see Ideopolis report for detailed discussion (this can be downloaded from [www.theworkfoundation.com](http://www.theworkfoundation.com))

Cambridge is one of the most knowledge intensive cities in the UK. Of all local authorities of a similar size, it has the highest level of knowledge-intensive businesses. Table 2 (below) outlines the extent of its knowledge

intensity. 62% of its population are employed in Knowledge Industries, 55% are in 'Knowledge Occupations' and 41% are employment in knowledge occupations in knowledge industries.

**Table 2 – Knowledge intensity in small cities<sup>3</sup>**

City	A	B	C	D
	Employed in Knowledge Occupations (Residence Based, 2001)	Employed in Knowledge Occupations in Knowledge Industries (Residence Based, 2001)	Businesses that are Knowledge Based (Workplace Based, 2001)	Employment in Businesses that are Knowledge Based (Workplace Based, 2001)
	%	%	%	%
<b>Cambridge</b>	<b>55</b>	<b>41</b>	<b>45</b>	<b>62</b>
Winchester	52	36	41	55
Bracknell	47	31	46	40
Watford	45	28	34	42
Worthing	41	25	33	52
Worcester	39	23	30	36
Stevenage	37	21	35	38
Dover	36	24	25	33
Darlington	36	21	25	37
Gloucester	34	20	28	43
Lincoln	32	18	28	44
Carlisle	31	17	24	30
Burnley	31	16	28	33
Hartlepool	29	16	25	38

*N.B. Data unavailable for Derry*

<sup>3</sup> Local authorities with populations under 110,000.

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Cambridge has also grown in knowledge intensity, with growth in the knowledge intensive industry (as a proportion of total businesses) increasing faster over the period

1998-2004 than the UK average. Total growth nationally in this period was 9%, against 10% in Cambridge (table 3 below)

**Table 3 – Growth in percentage of businesses that are knowledge based for the case study cities**

	1998 Businesses that are Knowledge Based (Workplace Based) %	2004 Businesses that are Knowledge Based (Workplace Based) %	Growth 1998 - 2004 %
UK Average	30	33	9
Birmingham	28	32	13
Brighton and Hove	36	42	15
Bristol	35	39	12
<b>Cambridge</b>	<b>42</b>	<b>46</b>	<b>10</b>
Edinburgh, City of	37	40	8
Glasgow City	31	34	10
Manchester	33	38	13
Newcastle-upon-Tyne	32	35	11
Sheffield	26	31	20
Watford	34	34	0

Source: Annual Business Inquiry,

Method: The Work Foundation Definition Knowledge Intensity, District/Unitary Local Authority units

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### 5. Ideopolis driver analysis: strengths, challenges and opportunities

#### Ideopolis drivers

This next section of this case study will analyse Cambridge according to the nine drivers of the Ideopolis<sup>4</sup> which have been identified through our literature review, data modelling and case study research. It will consider the following questions: what are the factors that have supported Cambridge's success? And what are the remaining challenges that the city faces, as well as the opportunities that will support Cambridge in realising and sustaining the vision of the secondary Ideopolis?

#### 5.1 Physical Knowledge City

Cambridge is a physical knowledge city: a historical city centre with attractive University buildings, access to the countryside and a good housing stock in neighbouring towns and villages. However, there is a fear that Cambridge's success threatens the physical knowledge city that has been created.

For example, Cambridge's historic city centre and tight planning regulations around new development have caused problems for physically accommodating new growth. However, business parks which are generally seen as high quality, with landlords who are used to dealing with high-tech businesses and are consequently flexible, have, in part, addressed this challenge. This has both facilitated growth and attracted new firms to Cambridge. One interviewee, a businessman, gave them as an important reason to move to Cambridge. In spite of this, there have also been concerns expressed about business parks being built far from public transport, thus encouraging car use, and that the style in which they are often built detaching them from the rest of the urban fabric<sup>5</sup>.

Interviewees also complained of a second problem, high house prices. In 2002, the

mean price for a terraced house in the city was around £190,000, compared with £103,000 nationally and £114,000 for the East of England<sup>6</sup>. This results in recruitment problems for some businesses as specialist staff may find the prospect of living in Cambridge too expensive, or may find the housing that they are able to afford to be lacking in quality. Indeed, many professionals who do work in the town live in the surrounding towns and villages. One of the main outcomes of commuter patterns is traffic congestion as many people are reliant on their cars to get into or around Cambridge for work. These issues are starting to be addressed. For example, the development of 8,000 houses at nearby Oakington, linked by a guided Busway to Cambridge<sup>7</sup>. For Cambridge to retain its physical knowledge city, it is vital that transport and housing planning is better co-ordinated by the local authorities involved.

#### 5.2 Building on what's there

Cambridge has built on its research and development activity, and the reputation of the university, which constitutes its principal asset. One of the critical factors here has been a critical mass of highly skilled people in the labour market.

<sup>4</sup> For a full account of the Ideopolis drivers, please read the full report which can be downloaded from [www.theworkfoundation.com](http://www.theworkfoundation.com).

<sup>5</sup> Bill Wicksteed

<sup>6</sup> ONS (2006) Neighbourhood Statistics

<sup>7</sup> [Cambridgeshirehorizons.co.uk](http://Cambridgeshirehorizons.co.uk)

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Cambridge has a cluster of high-tech companies, many of which were spin offs from the university. As such, the city has considerable strength in high-tech research and development, strengthened further by the thick institutional environment of technology consultants, including Cambridge Consultants, which provide support to capitalise on research that often took place in the university.

### 5.3 Diverse specialisation

Many of the high-tech firms in Cambridge are highly specialised, although the focus of these firms remains “broadly based”<sup>8</sup>. Strengths include software, and technology consultancies, with Biotechnology emerging as a key driver in recent years.

The economic success of the city goes beyond that of other university towns. Furthermore, Cambridge has other institutional effects support business start-ups. For example, Cambridge Network was developed by local entrepreneurs as a private business-networking organisation. The network is reliant on subscriptions, and has therefore developed without public sector funding; differentiating Cambridge from other cities that are heavily reliant on publicly funded networks.

In addition, technology consultancies are an important local industry and have also helped as a catalyst for exploiting local creativity. Successful entrepreneurs often stayed in the area, a second factor in the entrepreneurial success. One interviewee described this as the “growth of serial angels”<sup>9</sup>. Interviewees saw Cambridge as a functioning ‘cluster’ of high-tech

firms, where the interaction was as important as the concentration of firms.

### 5.4 High skill organisations

Cambridge retains a critical mass of high-skilled jobs in high wage organisations. This is one of the principle reasons for its attraction to knowledge workers. The city has a “flexible specialist labour market”<sup>10</sup>, which attracts both workers who know that, if they need to, they are more likely to get jobs nearby, and firms who are more likely to be able to fill specialist positions.

In common with many areas that succeed in the ‘knowledge economy’, Cambridge has problems in achieving a ‘trickle down effect’. The Cambridge phenomenon has been good at creating millionaires, well-paid scientists and service staff. However, intermediate work tends to go further afield. Given the high house prices, these factors do not make Cambridge an attractive or practical city for some people to live in.

### 5.5 Vibrant Education Sector

The university is the crux of Cambridge’s economic success. It has provided a range of benefits – from a research base to high quality architecture, which have underpinned the success and shaped the nature of the city’s success.

Firstly, the large student population means that a lot of very highly qualified people have lived in the city at one time in their lives, a significant factor when they are considering the locations of their businesses<sup>11</sup>. This is also a factor in

<sup>8</sup> Bill Wicksteed (2004) the University and the social-economic environment: reflections from Cambridge UK, available from [www.sqw.co.uk](http://www.sqw.co.uk)

<sup>9</sup> Ideopolis Interviewee

<sup>10</sup> Wicksteed (2004) *ibid*

<sup>11</sup> A survey by SQW Consulting in 2000 found that the most frequent reason for companies to locate in Cambridge was “Personal connections to the area (a founder or senior manager knew the area and was confident of being able to find their way around)”. This was a factor for 25% of firms surveyed. (Bill Wicksteed 2004 “Elements of attractiveness in the knowledge economy”)

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distinctiveness. The attraction of the university to students and researchers from outside has also been a factor in creating a more diverse population.

Former students continue their connection with the city: they leave the university and enjoy hanging around; Cambridge is familiar and so set up their businesses there. Furthermore, the University is powerful beyond the critical mass of students and highly skilled employees. One interviewee remarked that if the vice chancellor wants to do something she is able to.

The university also provides valuable cultural services to the region. These include museums, art galleries and theatres. There is, however, often a problem in making some specialist university facilities more outward facing. The cultural facilities run by the university are getting more outward facing and engaging more with the community. Some people felt the university was esoteric, and difficult to work with. The collegial system fragmented responsibility, although the corporate liaison group was seen as a way in.

The dominance of the university also presents problems; in particular this is related to the maintenance of its world-class status. There is a tension here between the needs of the university and its reliance of 'standard' UK research funding. Here, Cambridge is over reliant on one university – it may be important here to create some diverse specialisation in educational institutions.

### **5.6 Distinctive knowledge city offer**

Cambridge knows where it fits, and presents an economic and social distinctiveness. The city is physically distinctive, with attractive historic architecture and excellent green spaces. This mainly derives from the university, but extends into attractive suburbs relatively near the city

centre. Some iconic areas, such as the backs, extend the city's international reputation. The city's economic success has also been well publicised and has a strong international reputation.

Cambridge also has relatively high levels of tourism, providing a second important industry for the city. It also provides recognition for Cambridge companies, and attracts investment in. The world-class reputation can cause problems due to the pressure of expectation; Cambridge is a relatively small city and cannot always maintain the facilities its reputation promises.

Cambridge has a distinctive brand, but it faces problems in maintaining its lead. In the city centre, it is trying to compete against other regional centres by continually investing in new retail development. And there are further problems of 'competition' with the area around Heathrow which is benefits from strong international connections.

### **5.7 Leveraging strong connectivity**

Cambridge has strong transport links to London and internationally. The train service is regular and quick, with journey times from 45 minutes. Road transport to London is also relatively quick, as the town is only 74 miles away, although local congestion is a problem. Proximity to London has had some negative effects, with concerns that new developments in Cambridge were aimed more at people commuting to Kings Cross rather than those working in the Cambridge itself.

The city's internal transport infrastructure has found it difficult to cope with growth, in part due to the historic pattern of development in the city centre. There is considerable congestion in the city centre, with no mass transit system. A high proportion of the population travels by

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bus or bike. The future of the connectivity in the area was also a problem. One interviewee complained that this was, at least in part, due to the areas affluence, which meant it did not qualify for certain structural funds which would have allowed it to accommodate this.

The city is well served by Stansted airport, offering travel around Europe and the UK. It is also relatively close to Luton, and not prohibitively far from Heathrow or Gatwick.

### **5.8 Leadership around a knowledge city vision**

Here, Cambridge offers a different model to comparator models. Leadership has largely been from private sector– provided by networks, such as the Cambridge networks, and key individuals. The dominance of the university over the city also means that the vice chancellor wields considerable power.

Governance structures are not at the appropriate level, meaning there is a tension between the city government and its hinterland. The city council has very tightly defined boundaries, and so many of the surrounding and interconnected settlements are outside of its control. The movement of people across local authority boundaries in Cambridge also gives rise to tensions related to the funding of local services. For example, those living in South Cambridgeshire are often users of cultural and other facilities provided by Cambridge City Council, and yet these are funded, in part, by the council taxes raised by the city.

### **5.9 Investing in the community**

Cambridge has good public services, which is seen as a prerequisite for attracting knowledge workers. Schools are good, with high quality and centrally based state provision.

Addenbrookes teaching hospital is large and well equipped, given the size of the city; Cambridge has a regional function as a health centre.

Like other cities, Cambridge has not managed to achieve a 'trickle down' effect. Furthermore, the increasing pressures of house prices and on transport infrastructure make it likely that Cambridge will suffer increasingly from labour market polarisation and from concentrated pockets of deprivation. In addition, there are concerns that there is insufficient provision in the growth areas for 'soft' infrastructure, such as community centres, which underpin the development of successful communities.

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### 6. Conclusions

There is a strong argument for Cambridge to be a secondary Ideopolis. However, Cambridge is not the central city of a city-region, meaning that the Ideopolis city-region vision is not appropriate to the city. There are a variety of small towns and villages surrounding Cambridge, such as Ely, and these benefit from the city's success as many knowledge workers live outside of the city council's boundaries. However, Cambridge has a population of only 100,000, and can hardly be said to be driving growth across a wider region. In many respects it is in the economic orbit of London. As the driver analysis shows, this lack of scale and lack of links to the wider regions are one of the main barriers to further growth, and the reason that the secondary Ideopolis vision is more appropriate for Cambridge.

#### Future Vision for Cambridge

Cambridge's future vision is one of continued success, dependent on the following factors:

- Developing a stronger creative and cultural offering.
- Making prosperity more inclusive
- Driving growth in the wider region

### 7. Policy Recommendations for Cambridge

Cambridge needs to accommodate its growth and share the wealth it creates more widely with the region.

#### Leveraging strong connectivity

- Coordinate transport links in the wider region, to allow the benefits of growth to spread out.
- Encourage public transport to business parks as an alternative to car use.

#### Leadership around a knowledge-city vision

- Improving co-ordination within the wider region.

#### Investing in Communities

- Build community facilities and 'soft infrastructure' in new areas of development.
- Address the 'hourglass' labour market: this could be through working with entrepreneurs to retain or locate auxiliary services within and around Cambridge.

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### 8. Lessons Learned from Cambridge

Cambridge offers many lessons for other cities:

**Build on what's there:** Cambridge did not try and reinvent itself, but developed by taking advantage of its principle asset – the University.

**Specialise in diverse niche sectors:** The city has a variety of high-tech sectors; it is not over reliant on one.

**The private sector can work with the public sector to achieve growth:** Growth has been largely private sector led. Networking and business development services have mainly come from private businesses or associations, and these have put in place the entrepreneurial framework for growth.

**Networks can achieve something:** Economic success has been led by a network of consultants, businessmen and scientists, working with one another to create a phenomenon. These networks have largely been built organically, and are adaptable to change.

**The public sector must be able to manage the growth:** Cambridge has lacked the structures of spatial governance to manage the congestion and house price problems that result. Criticisms have also been made that Cambridge could have benefited more from national policy which recognised its leading edge status.

### Appendix A: Interviewees

This case study presents findings from a literature review and consultation with the following people:

- Nigel Cutting, Cambridge City Council
- Peter Hewkin, Cambridge Network
- Chris Moore, Kodak
- Phil O'Donovan, CSR
- Andrea Stark, Arts Council