Understanding Interdisciplinary Ecosystems:
Social Construction of Scholarly Communication

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Projections about transformation of scholarly communication practices due to new technologies through new ways of creating, sharing, and discovering data

Increasing reliance on distributed and interdisciplinary teams in scientific endeavors

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Increasing reliance on distributed and interdisciplinary teams in scientific endeavors

Reciprocal process between new features offered by technologies and the social/cultural aspects of scholarly discourse

Illustrate how we can adapt frameworks and theories from science and technology studies (STS) to expand our tools in exploring scholars' needs and service models for libraries in meeting these needs.

Presentation Outline

- **PART I:** Role of expanding our understanding about the day-to-day practices of researchers

- **PART II:** Sample research methods
  - Two studies <u>in progress</u> at Cornell to explore interdisciplinary scholarship in researchers' natural habitats

- **PART III:** Brief introduction to social constructivist theoretical frameworks
  - Additional lenses as we conceptualize, design, assess, and promote ICTs

Terminology

- <u>Scholarly communication</u> - Process by which scholarly information is produced, certified, disseminated, preserved, and used.

- <u>Interdisciplinary</u> – Integration of concepts, philosophies, and methodologies from different fields of knowledge.

- <u>Science</u> - In its broadest sense, science refers to any systematic knowledge or practice.

- <u>Information and communication technology</u> (ICT) - Convergence between computer technology and communication technology in retrieving, presenting, and managing information.

Why study scholars?

Disciplinary characteristics, work practices, and principles of academic discourse play an important role in researchers' adoption and use of ICTs.

Scientists themselves are a much-observed species, both from afar and also up close in their natural habitats.

Cronin, 2003

Why study scholars?

- Understanding the knowledge production and communication structures creates a <u>sociocultural context</u> for assessing the role of ICT in academic work.

- Studying scholars' research and collaboration styles reveals useful <u>design principles</u> to factor in the development of e-scholarship technologies and services

- Observations and conversations about work practices provide "<u>information in context</u>"
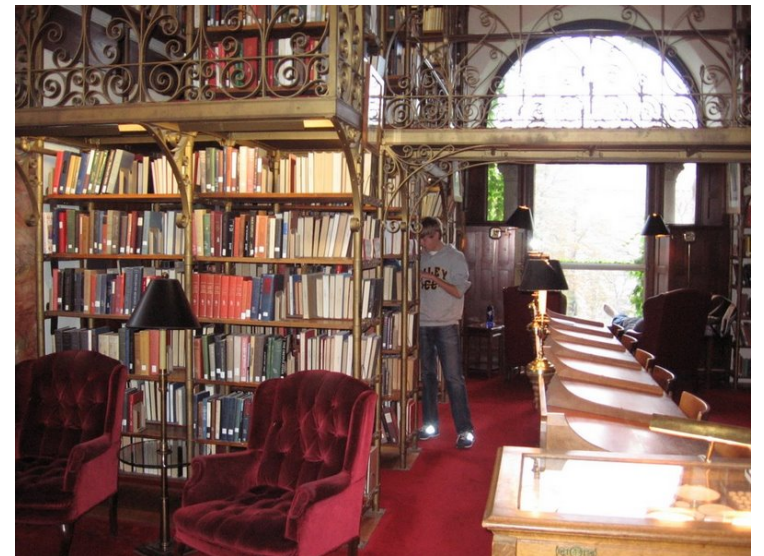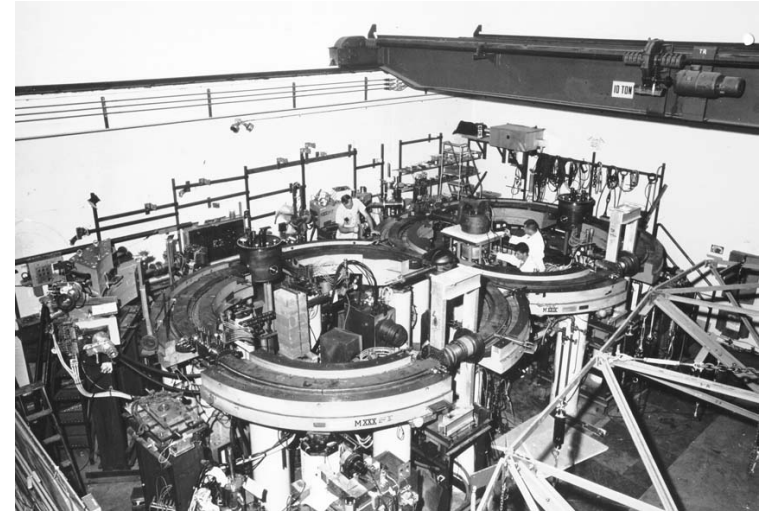
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CASE STUDY I:

Collaboration Among Medical Scientists & Biomedical Engineers

Collaboration Vision

- Imagine a device that could deliver perfectly targeted chemotherapy drugs to the area of the brain affected by a brain tumor.

- Envision a therapy that involves systemically injected gene therapy that could be used to treat Alzheimer's disease.

- Think of an implanted device that could detect the origin of a seizure.

Cornell Weill Medical College, New York

Cornell Biomedical Engineering, Ithaca

human computer interaction group

an interdisciplinary research team investigating social, psychological, & design issues using an iterative, user-centered approach building multi-media environments that support involvement, experimentation, exploration, and collaboration.

HCI Research Team

Jeremy Birnholtz
Geri Gay, PI
Gilly Leshed
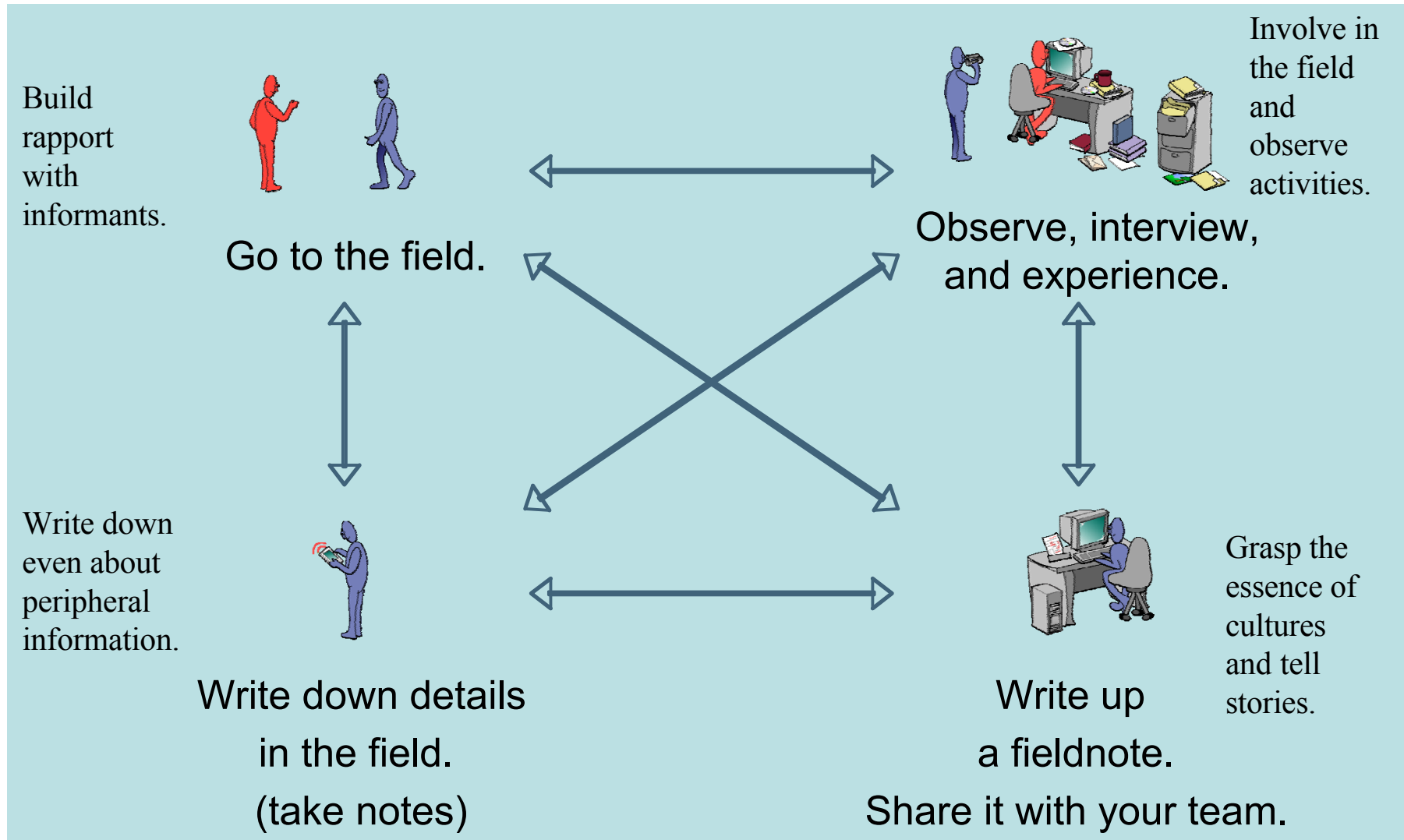Saeko Nomura, Chief Ethnographer
Oya Rieger

HCI Research Goals

- Explore the factors that inhibit or facilitate interdisciplinary collaboration

- Understand the critical elements of supporting distributed academic work

- Learn about their knowledge sharing systems

develop design principles for ICTs to improve collaborations among scholars

Research Methods: Fieldwork

- Two weeks of ethnographic observations
  - Attend meetings, retreats, operations, talking with post-docs and assistants, etc.
  - Observations by research team members based on common protocols

Fieldwork

Build
rapport
with
informants.

Go to the field.

Involve in
the field
and
observe
activities.

**Observe, interview,
and experience.**

Write down
even about
peripheral
information.

**Write down details
in the field.
(take notes)**

Grasp the
essence of
cultures
and tell
stories.

**Write up
a fieldnote.
Share it with your team.**

Palo Alto Research Center & Saeko Nomura (Cornell University)

Research Methods: Interviews

- Interviews with 23 researchers from the two departments
  - Contextually dependent interviews structure

Sample Observations

- Confirmation of finding differences in disciplinary cultures
  - Work hours, structure of work days, methodologies, professional goals, tenure requirements

- Shades of interdisciplinary collaboration

- Role of social networking in information identification and retrieval
  - "Borrow direct" based on their own network
  - Reliance on their colleagues' web pages for full text articles

Design Principles

- High technology environments for research with minimal use of ICTs
  - Starting point is "communication"

- Grant writing is a major activity!
  - University of Illinois at Urbana-Champaign's "return on investment study"

- Data as collaboration facilitator
  - Postdocs and graduate students as "data curators"

CASE STUDY I:

Interdisciplinary Collaboration Among Humanists

Society for the Humanities

The society brings distinguished Visiting Fellows and Faculty Fellows together each year to pursue research on a broadly interdisciplinary focal theme.

Research Methods

- Attend the 2-hour presentation & discussion sessions
  - 21 fellows representing different humanities disciplines and at different professional stages

- Attend Wednesday luncheons
  - socialize, talk about research & scholarship

- Interviews – just started!
  - contextually dependent interviews structure

Research Questions

- What does "interdisciplinary work" entail in the humanities?

- What is the role of ICT in facilitating scholarly communication and collaboration?

- Is there a transformative role for ICT beyond introducing efficiencies?
    - Changes to authorship & readership

design and service principles for e-humanities

Preliminary Observations

- Definition of collaboration and interdisciplinary research in humanities
  - Integrating perspectives, social theories, and philosophies from different disciplines.
  - Their personal interpretation central to their papers
  - Deconstructing of ideas and analyzing texts from various angles

- Humanists often work alone
  - Majority of the publications by the fellows are solo-authored.

- Reading, interpreting, and writing is at the heart of scholarship
  - Deep reading, close reading, not-reading, re-reading

Preliminary Observations

- As opposed to the first case study, who create much of their own data, humanists seek to reconstruct, describe, and interpret existing data
  - Heuristic and hermeneutics are the core activities in the humanities

- ICT use
  - No information yet – is likely to be revealed during interviews

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method ⟷ theory
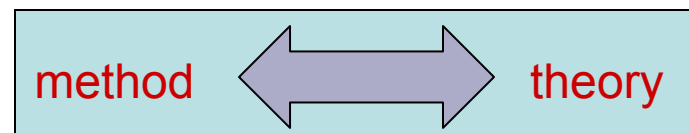
research methodology

Social Construction of Technology

- Developed as a reaction to technologically deterministic approaches
  - "inevitable shift to a digital realm"
  - "humanities as a conservative culture"
  - "lack of faculty interest in change as key barrier to wider adoption of ICT"

- Social, cultural, and political values affect technological innovation & appropriation
  - mutual shaping & "mediation-in-action"

Social Construction of Technology

- Sample social constructivist theories
  - Social Construction of Technology (SCOT)
  - Actor-Network Theory (ANT)
  - Socio-Technical Interaction Network (STIN)
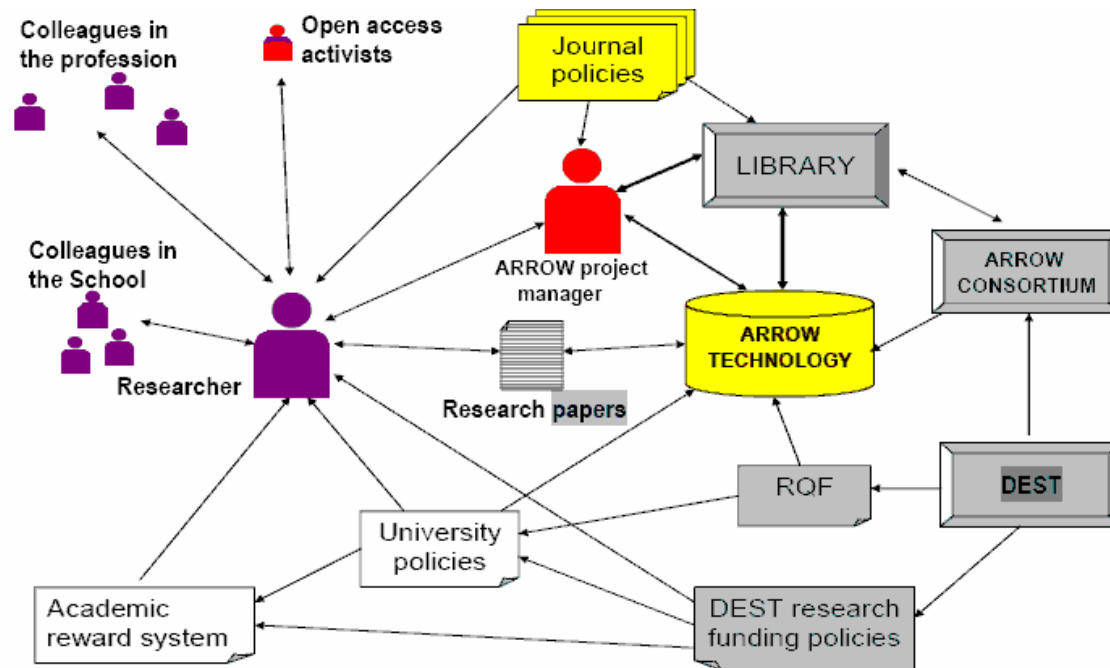
Sample Study:
Kennan & Cecez-Kecmanovic, 2007

Sample Study:
arXiv -Not a Matter of Time

- Well established preprint culture that precedes the online pre-prints archive

- Strong collaborative culture due to joint grant-funded projects

- Mutual dependence

- Collective arrangements for validating new knowledge claims|

- Low publication rejection rate
  - 24% in physics vs. 85% in philosophy
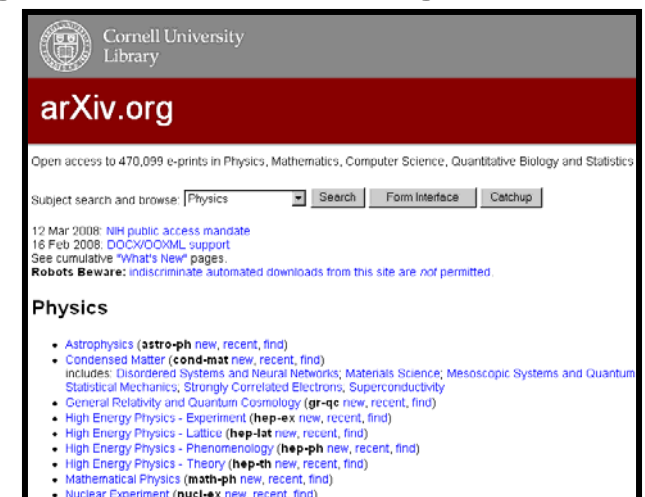
Kling, 2004; Bohlin, 2004; Fry, 2006

Strategies for Scholarly Communications Research

- Reconfiguring scholarly communication requires a more nuanced approach to understand social dynamics and role of "structures" as well as technical issues

- Triangulation through interdisciplinary research by merging theories and frameworks expand our horizons

- Thick descriptions are useful in expanding our understanding but need to be generalized carefully

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