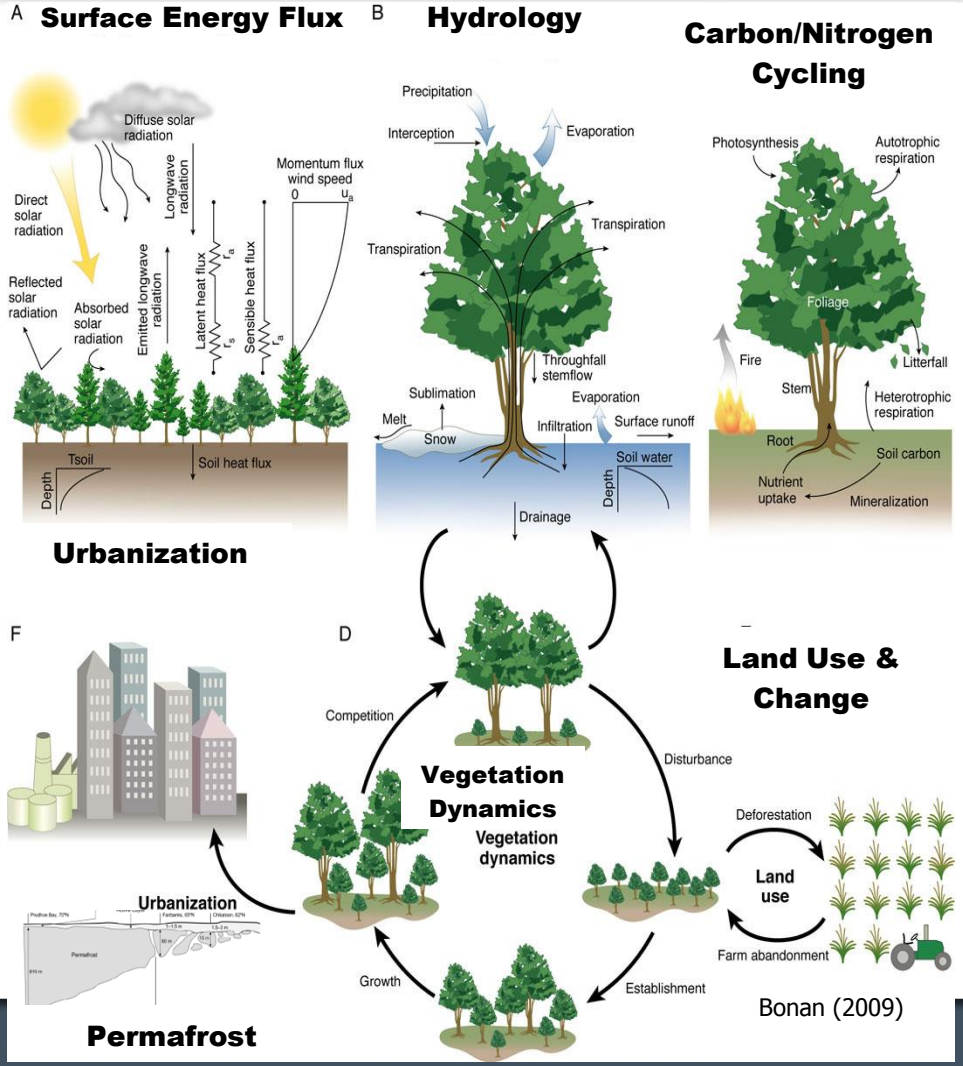
COLORADOSCHOOLOFMINES

RESEARCH DATA MANAGEMENT

What is it?
What do I need to do?

Nature of Research: Data and Complexity



- Research problems are increasingly interdisciplinary & complex
- Collaboration requires open sharing of data
- Data are highly heterogeneous and largely incompatible in their native formats
- Data is digital

Nature of Publishing: A Rethink

EVALUATING UNITED STATES AND WORLD CONSUMPTION OF NEODYMIUM, DYSPROSIUM, TERBIUM, AND PRASEODYMIUM IN FINAL PRODUCTS

By
Matthew Hart

- *Thesis/Dissertation is advertising* for your science
- Contains only a portion of results
- Data publishing getting formalized
- Don't have to sign away all rights (only first-publication rights)

Research Data Defined

- Factual info to support & validate research findings
- Analog or digital
- Observational, numerical or in-situ
- Imagery, audio or output from equipment
- Created from experiments or gathered as part of projects, surveys or other means
- Includes physical collections & software
- Collected by you or others

Research Data Management

Active and ongoing

collection, organization, care-taking & preservation

of research data through its lifecycle of interest and usefulness to scholarship, science and education.

With the end goal of ***discovery, retrieval and reuse*** for new science, education and even general public interest.

Why Care About Research Data Management

Researchers (YOU)

- Achieve greater research outcomes & impacts
- Facilitate collaboration & reuse
- Validate research
- Conform to institutional, publisher & funder policies

Institutions (MINES)

- Build upon previous research
- Reduce legal risk & data loss
- Attract more research $$
- Conform to funder's policies

U.S. Government Directive & Public Access

New Requirements Placed on Research Data

"*…. unclassified research supported wholly or in part by U.S. Government funding should be stored and publicly accessible to search, retrieve and analyze*."

(February 22, 2013)

Publishers and Data Access: AGU Example

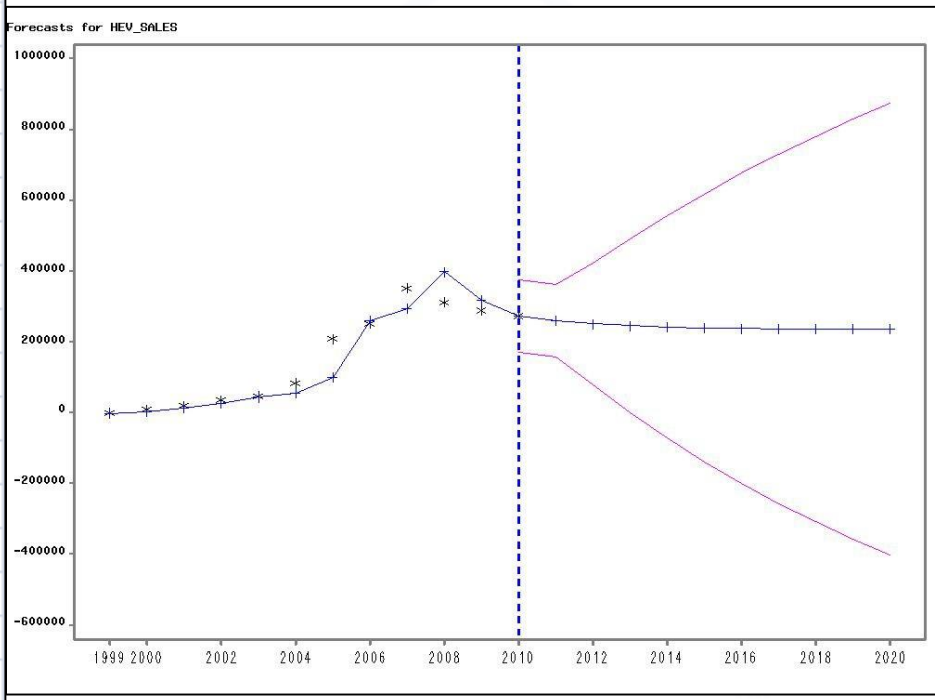
- Data necessary to understand, evaluate, replicate and build upon reported research must be accessible whenever possible
- Data sets that are not accessible may not be cited in AGU publications
- AGU reserves right to refuse publication for non-compliance of this Data Policy

(December, 2013)

So What Do I Need to Do?

Projections of new hybrid vehicle sales in the U.S. (2011 to 2020)

YEAR	ACTUAL	PREDICT	UPPER	LOWER
1999	17	-1563	101144	-104270
2000	9350	3147	105854	-99560
2001	20282	13731	116438	-88976
2002	36035	26127	128834	-76580
2003	47600	44043	146750	-58664
2004	84199	55165	157872	-47542
2005	209711	99684	202391	-3024
2006	252636	261674	364381	158967
2007	352274	295734	398441	193027
2008	312386	398904	501611	296197
2009	290271	318673	421380	215966
2010	274210	274370	377077	171663
2011		260604	363311	157897
2012		251798	424423	79172
2013		246111	491134	1087
2014		242438	556573	-71698
2015		240066	618619	-138488
2016		238534	676727	-199660
2017		237544	730961	-255873
2018		236905	781619	-307809
2019		236493	829072	-356086
2020		236226	873688	-401236
2021		236054	915809	-443700
2022		235943	955734	-483848



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Make Data More Accessible

- Create supplemental (data) files and read-me files (the explanation) 1GB size limitation
- If greater than 1GB, need to send data CD to ProQuest
- ***For graphs and tables***: include excel spreadsheets or comma separated data files (be sure to include source if from a 3rd party)
- ***For images***: if possible, provide data files to reproduce the image
- ***For physical samples***: ensure proper storage within your department and provide information how one might access the samples (create an appendix rather than supplemental file)

Making an Appendix

- **Paragraph**: describe files and relationships to thesis and other files
- **Table**: list each file; describe it (content, format, how it works)
- **Other Info**: list software used or other pertinent info

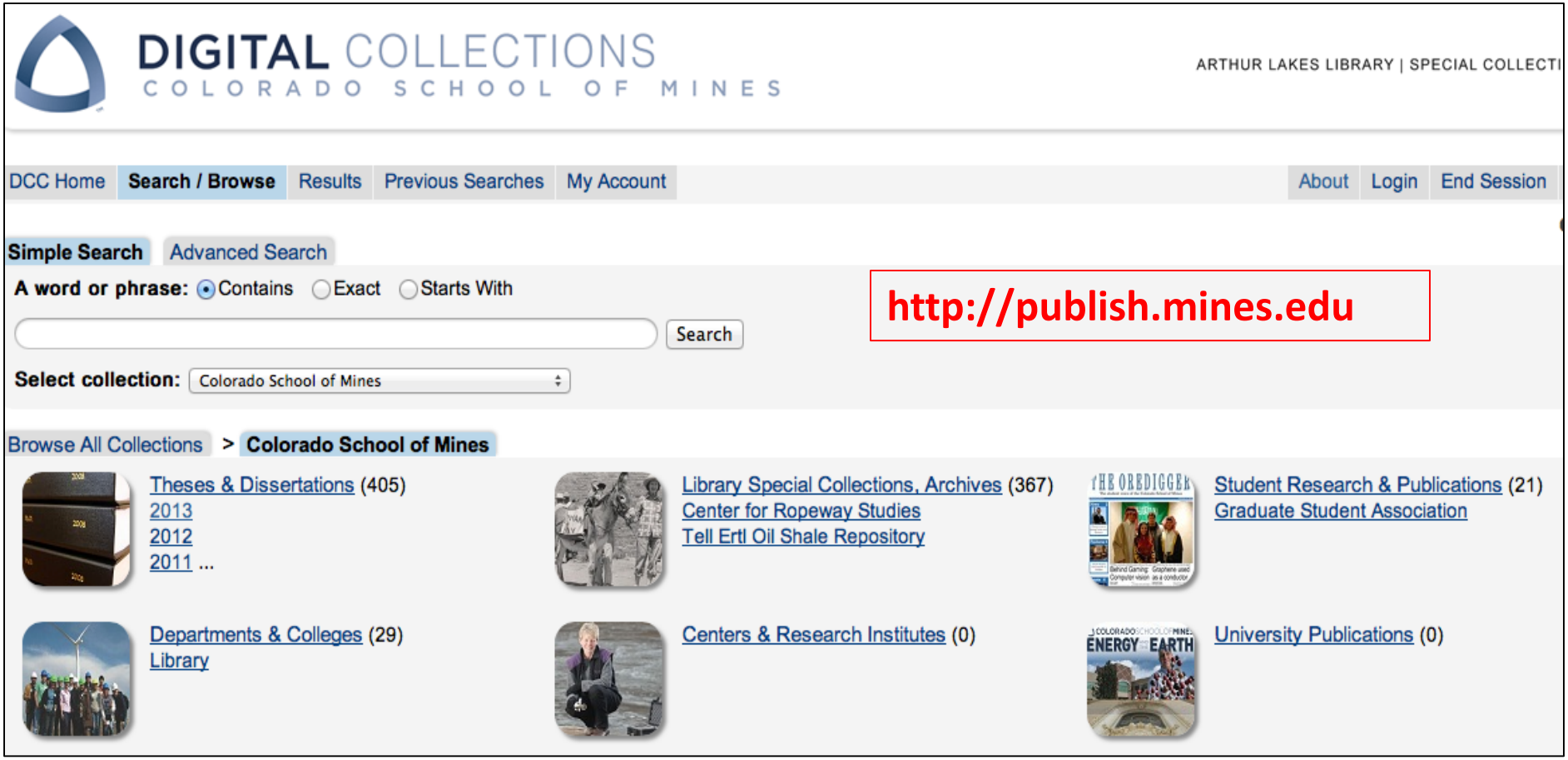
APPENDIX F

SUPPLEMENTAL ELECTRONIC FILES

Include a paragraph broadly describing what is included as part of the supplemental electronic files and how these are related to the thesis. Also include a brief description of how the files/descriptions are organized in this Appendix. You may include as part of your supplemental electronic files any file that is a critical part of your thesis. This may include files containing laboratory measurements, other data, program source code, etc. Executable files may not be included.

Geographical Data Files	Files containing geographical location information of all survey lines. Files include raw survey data, reduced survey data showing relative location of each station with respect to a survey base station, and absolute latitude and longitude of each survey location. All files are in Microsoft Excel 2003 format. See figure 2.3 for area map show location and orientation of each survey line.
GeographDescript.txt	ASCII file containing description of data file format for all files containing geographical information included as part of these electronic supplementary files.
Line111.xls	Geographical survey information for line 111. See figure 2.3. See GeographDescript.txt for description of data included in each page and for each column of the spreadsheet.

Where Does my Work Reside?



Full-View of an Item

Object	View this item Efficient computational models for patte... - PDF Document (2 M)
Bookmarkable URL	http://hdl.handle.net/11124/237
Authors	Jeavons, Peter
Title	Efficient computational models for pattern formation in fixed and evolving domains
Advisor	Ganesh, Mahadevan
Subjects	Pattern formation (Biology) -- Mathematical models Reaction-diffusion equations Finite element method Convergence Algorithms
Description	Bibliography: pages 61-62. viii, 62 pages : illustrations (some color)
Abstract	We efficiently model spatial patterns formed by nonlinear reaction-diffusion equations for benchmark reaction kinetics. Computational methods for modeling reaction-diffusion equations have been presented extensively in literature. Efficiency in these computational methods, either higher convergence or reduced computation time, is desired. We use a moving finite element method presented in literature and adapt it to include a second order convergence discretization and linearization. An algorithm is presented that utilizes these higher convergence methods. Numerical results demonstrate the order of convergence and reduced computational times required to model pattern formation on stationary and time dependent spatial domains. Mode isolation using manipulation of the Turing parameter space is conducted for validation. Pattern evolution on time dependent spatial domains is demonstrated.
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Where Can I Find More Information?

web: http://rds.mines.edu

Services: data plans, training, organizing, share/deposit, data citation, institutional publishing