Informatics Tools for Protocol Development

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COI per FDA 21CFR54.2: None applicable to this lecture

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Objectives

- To gain knowledge of the range of on-line resources and software available for use in research and clinical trials development to assist in the following:
  - Getting research ideas
  - Obtaining background information on scientific issues and problems
  - Obtaining copies of related clinical trials and methods
  - Scientific tools: image processing, statistical resources
  - Documenting your work with electronic notes, references, and back ups
  - Advertising your protocol (* with IRB approval). Web sites, social media
  - Funding sources: federal, philanthropies, email notices

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Acknowledgement

- Daniel Barboriak, MD
- Carl Jaffe, MD

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Getting Research Ideas

- What research is good to do?
  - Look at reviews, hypothesis statements, consensus of expert groups
- What research is not good to do?
  - Been done
  - Not interesting
  - Not feasible

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Ideas: sharing

- If you have an apple and I have an apple and we exchange these apples then you and I will still each have one apple. But if you have an idea and I have an idea and we exchange these ideas, then each of us will have two ideas.

George Bernard Shaw

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Ideas: search engines

- Google scholar http://scholar.google.com
- Bing http://www.bing.com
- PubMed www.ncbi.nlm.nih.gov/pubmed/

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Ideas: cutting edge meetings

- **RSNA** (Nov 26-30, 2023 Chicago, IL)
  http://www.rsna.org
- **SNMMI** (June 24-27, 2023 Chicago IL)
  https://www.snmmi.org/MeetingsEvents/index.aspx?navItemNumber=504
- **WMIC** (Sep 5-9, 2023, Prague, Czech Republic)
  https://www.wmis.org/wmic1/important-dates-2/

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Ideas: push technology

- RSS – to keep up to date
- Create personal accounts
- New article search by keyword or journal
  - https://www.ncbi.nlm.nih.gov/account
  - https://support.springernature.com/en/support/solutions/articles/6000083138-manage-springer-alerts-settings
- New article search that cites classic articles
  - http://www.scopus.com/home.url
  - http://www.webofknowledge.com/

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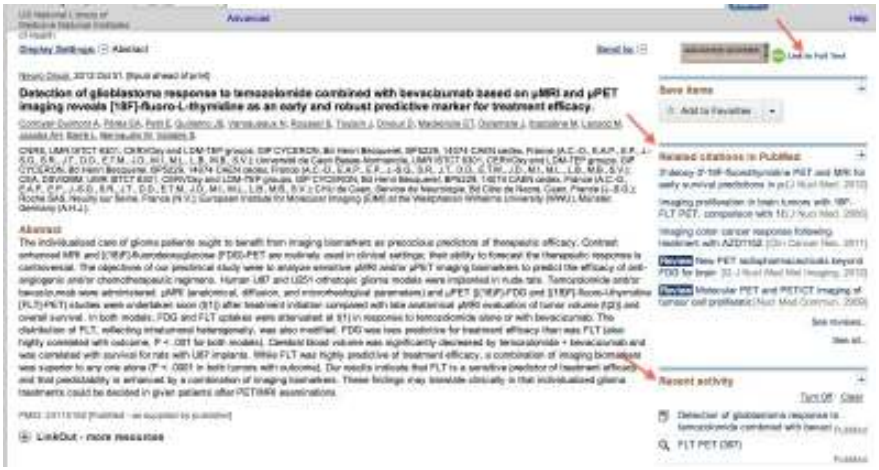
Pub Med detail



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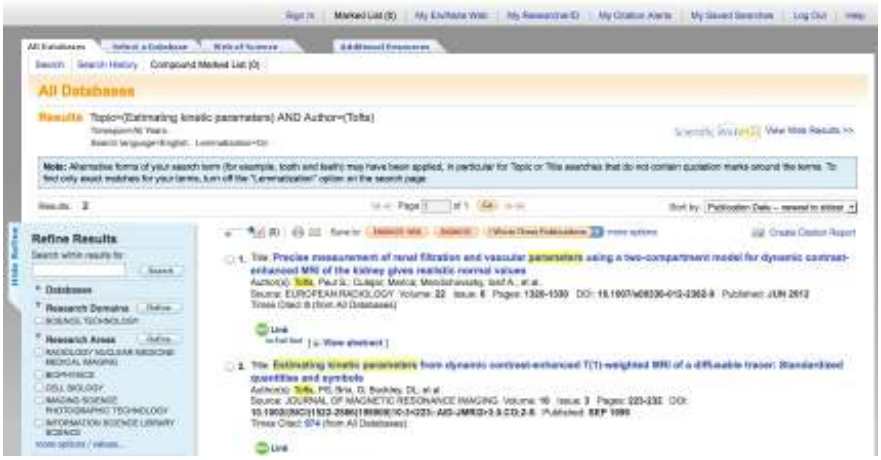
ISI web of knowledge



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Obtaining Background Information
on scientific issues and problems

- PubMed http://www.ncbi.nlm.nih.gov/pubmed
- RSNA journals https://pubs.rsna.org/
- Roentgen Ray Society http://www.arrs.org
- Clinical journals (J Clin Oncol, NEJM, ClinCancer Res)
- Science journals (Nature series, Science, CancerRes)
- NCI http://www.cancer.gov/
- SEER http://www.cancer.gov/statistics
- Cancer Imaging Program http://imaging.cancer.gov/

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My Commonly Used Mobile Apps

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Mobile Apps (& Websites)

- Clinical Trials Search ClinicalTrials.gov
- Drug Information: Epocrates, About Herbs, GoodRx
- Guidelines: NCCN, ESMO
- Cancer Regimens: HemOnc.Org
- Images: PACS system
- Genomics: Caris
- Adverse Events: CTCAE plus
- Medical Information: UpToDate
- Prognostic tables and nomograms
- Meeting information and abstracts
- RSNA journals http://publications.rsna.org
- Roentgen Ray Society http://www.arrs.org
- Clinical journals (J Clin Oncol, NEJM, ClinCancer Res)
- Science journals (Nature series, Science, CancerRes)
- NCI http://www.cancer.gov/
- SEER http://www.cancer.gov/statistics
- Cancer Imaging Program http://imaging.cancer.gov/

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Background Information: troubleshoot

- Avoid redundancy
- Look for weaknesses in the literature
- Check existing evidence based knowledge
- National registry of clinical trials
  - http://clinicaltrials.gov/
  - http://cancer.gov/clinicaltrials/search
- Read related trials- Google search on trial number, name, or properties if you know of such studies

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Clinical Trials Resources

- NCI CTEP
  - http://ctep.cancer.gov/
  - NCI National Clinical Trials Network

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Methods Standardization

- QIBA – Quantitative Imaging Biomarker Alliance of RSNA
  - Detailed profiles and protocols
  - https://www.rsna.org/qiba/

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Online Training

- Clinical trials certification CITI
  https://www.citiprogram.org
- NIH Online Presentations and Summaries
  https://clinicaltrials.gov/ct2/manage-recs/present
- Many universities offer training

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Scientific Tools: Image Processing

- Image J http://rsbweb.nih.gov/ij/
- Fiji http://fiji.sc/wiki/index.php/Fiji
- Medical Image Processing, Analysis and Visualization http://mipav.cit.nih.gov
- 3D Slicer http://www.slicer.org
- Horos (free) https://horosproject.org
- Osirix http://www.osirix-viewer.com
- PMOD http://www.pmod.com/technologies/index.html

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Imaging Processing

- Precision Imaging Metrics (Yunu) https://www.precisionmetrics.org/
- Mint Medical https://mint-medical.com
- Neuroimaging Informatics Tools and Resources Clearinghouse (NITRC) https://www.nitrc.org/
- I do imaging (Free) https://idoimaging.com

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Imaging Processing: other tools

- Simulation
  - JSim
- CAD tools
  - Neural networks
    - JavaNNS
  - Support vector machines

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Scientific Tools: statistical tools

- Web tools
  - http://en.wikipedia.org/wiki/List_of_statistical_packages
  - The R project http://www.r-project.org
  - Vanderbilt free PS: Power and sample size calculator https://biostat.app.vumc.org/wiki/Main/StatCalc
  - Collaboration with a real human statistician

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Scientific tools: other sources

- Open source data / imaging archives
  - Available DICOM images to test methods and parameters derived from images
  - The National Biomedical Imaging Archive (NBIA) is a searchable, national repository integrating in vivo cancer images with clinical and genomic data http://cancerimagingarchive.net

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Documenting your work:
electronic notes, references, and back ups

- The traditional lab notebook no longer works for many of us
- But what is the right answer?
- Choices: proprietary vs. open source, documenting patents, cloud vs. private, individual vs. collaborative
  - Google “electronic lab notebook”
  - Benchling https://benchling.com/academic
  - Evernote, Onenote, Google Docs

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Documenting: tabbed notebooks

- Good for reference info “how I did it and when” and “tasks lists”
- Keynote – NF (Windows)
  - https://sourceforge.net/projects/keynote-newfeat/
- The Guide (Windows)
  - http://theguide.sourceforge.net
- Dropbox https://www.dropbox.com
- Sugar Sync https://www.sugarsync.com
- Back Up your data multiple ways and get it automated.
- Security also a concern

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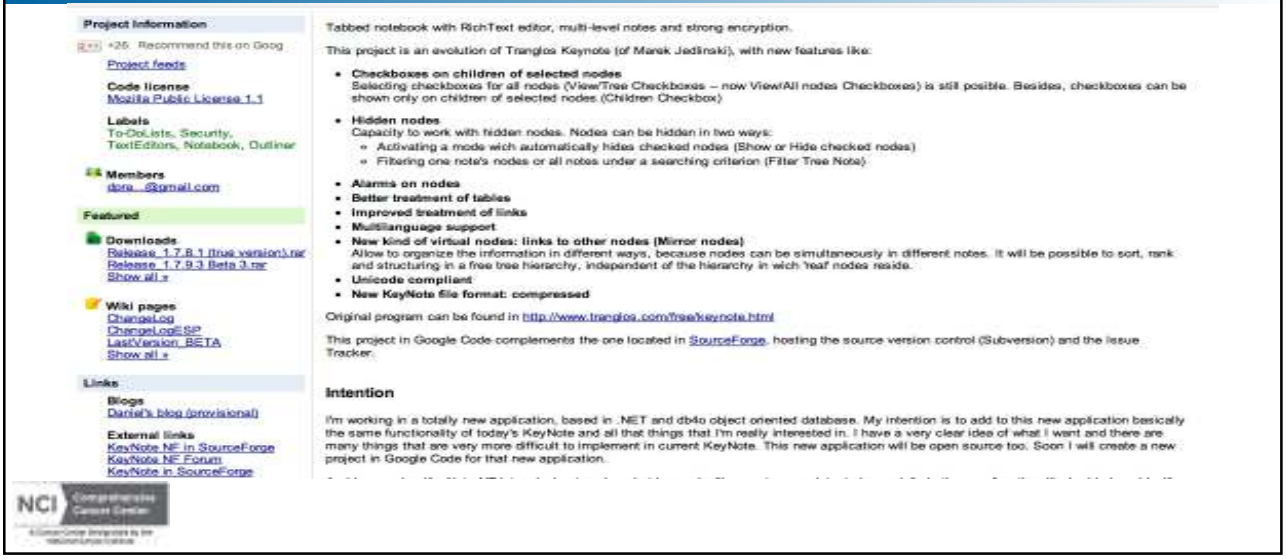
Keynote detail



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Writing Tools

- Importance of outlining
- Word
- OpenOffice http://www.openoffice.org
- Notepad (Windows) http://notepad-plus-plus.org
- Typesetting for scientific publications?
  - LaTeX http://www.latex-project.org
- Version Control- always an issue

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Bibliography Management

- Endnote http://endnote.com
- Papers https://www.papersapp.com
- Zotero (free browser, cloud based reference manager) http://www.zotero.org
- Mendeley (reference manager, PDF manager with annotation and commentary, a social networking site) http://www.mendeley.com

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EndNote detail

- Sharing libraries with all authors
- Papers can be attached to reference
- Add references from local and web library services

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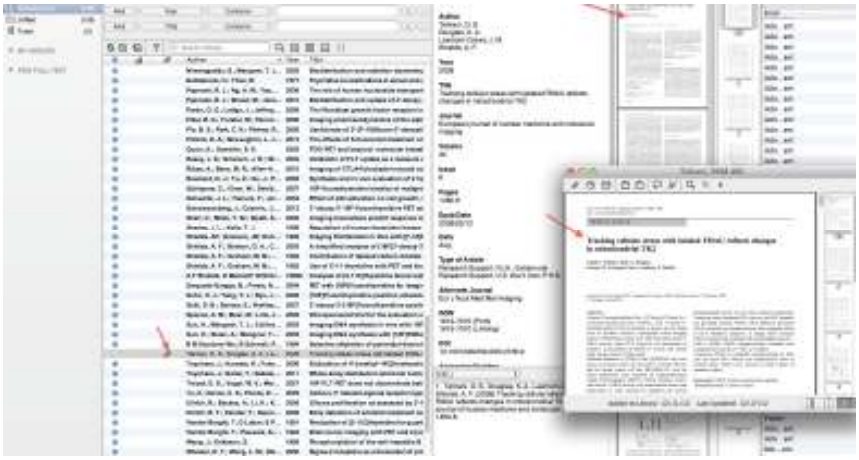

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Advertising your protocol

- Getting the word out
- Web sites becoming more important
  - Content management systems
  - Wikis
  - Websites as a collaboration tool
    - Basecamp http://basecamp.com
    - iMeet Central https://imeetcentral.com/
- Social media – the wave of the present
- All need IRB approval

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Advertising: e-newsletter

- Monthly Newsletter
  - Lists of trials
  - Articles on specific protocols
- Web search for trials at the cancer center
  - https://www.karmanos.org/karmanos/find-a-karmanos-clinical-trial
- Smart Phone App
  - KCI Trials at iPhone App store

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Selling your protocol

- Leadership is key – use communication effectively
  - Medicine is full of 'good ideas' – execution is all that counts
- Present to ALL stakeholders
  - Address their self interest
  - Accrual will be your Achilles heel
- Leverage institutional resources
- Don't be afraid to get out your message

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Funding

- Federal sources – NIH DOD NSF
  - http://grants.gov
  - Getting ideas and setting priorities
    http://www.cancer.gov/researchandfunding
    http://report.nih.gov
  - Grants awarded
    http://projectreporter.nih.gov/reporter.cfm
- Philanthropies
  - https://www.rsna.org/research/funding-opportunities
  - http://ww5.komen.org
  - http://www.pardeefoundation.org
- Industries (pharmaceutics, imaging)
- American Cancer Society
  - http://www.cancer.org/aboutus/acspolicies/state-fundraising-notices

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Questions?

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NCI Comprehensive Cancer Center

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