

Using AI To Deliver Personalized Conference Agendas

NKOS – Toronto October 20, 2024

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Agenda



- The publication process
- Overview of ASCO and taxonomy project
- Why provide session recommendations
- Plan to Use ‘Taxonomical Profiles’
- Session Recommender design
 - Questionnaire
 - Query
 - Outputs and functionality
- Lessons learned
 - User feedback from application
 - Usability studies
- Next Steps
 - Session Recommender 2.0
 - Member personalization

Research Announcement Paths

Conferences announce the cutting edge of science



PATENT

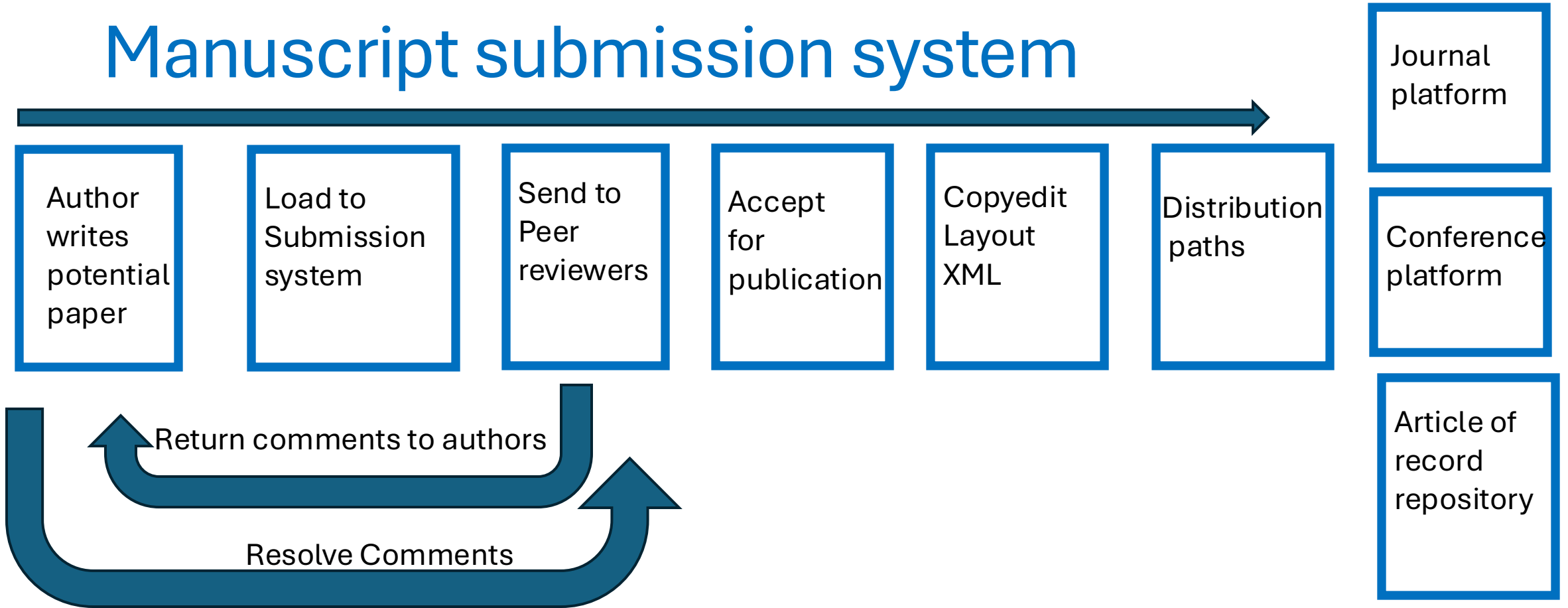


CONFERENCE



ARTICLE
PUBLICATIONS

Manuscript submission system



Article Distribution Channels

Organization Web site

Citations And References

Author Web site

Article reviews

Library Contracts



Conference Papers Distribution Channels

Organization Web site

Citations And References

Author Web site

Conference Program

Personalized apps



Conference sizes



- American Association for Cancer Research (AACR)
 - 7,200 presentations
 - 22,000 participants
 - cancer biology to cutting-edge therapies and innovations like AI and organoid models, spatial biology, cancer immunotherapy, computational models in cancer research, etc.
- SPIE Photonics West 2024
 - 24,000 attendees
 - 1,500 exhibitors
 - 5,000 technical presentations
 - biomedical optics, lasers, optoelectronics, quantum technologies, etc.

SPIE Conference App

Navigation: DATE TITLE SESSION PAPER

PRESENTATIONS CHAIRS/PROG. COMMITTEE

Biomedical Applications in Molecular, Structural, and Functional Imaging

Tuesday, 22 February

- KEYNOTE 12037-500**
Reading room design in the COVID-19 era: what have we learned and what can we do better
Tuesday, Feb 22 • 9:45 - 10:30 AM
Town & Country A
- PAPER 12036-43**
Phenotype guided interpretable graph convolutional network analysis of fMRI data reveals changing brain connectivity during adolescence
Tuesday, Feb 22 • 11:00 - 11:20 AM
Palm 4
- PAPER 12036-44**
Comparison of deep convolutional neural network models with OCT images for dental caries classification
Tuesday, Feb 22 • 11:20 - 11:40 AM
Palm 4
- PAPER 12036-47**
Graph signal processing to identify biomarkers in brain networks in dementia
Tuesday, Feb 22 • 11:40 AM - 12:00 PM
Palm 4
- PAPER 12036-38**
Recovery of complete time density curves from incomplete data using machine learning as a surrogate model

Navigation: DATE TITLE GRID

Search Events

TUESDAY, FEB 22

SUN MON TUE WED THU

8 AM 9:22 AM 10 AM 11 AM Noon 1 PM

- 8:00
- CONFERENCE 12036
Biomedical Applications in Molecular, Structural, and Functional Imaging
- CONFERENCE 12035
Computer-Aided Diagnosis
- CONFERENCE 12032
Image Processing
- CONFERENCE 12034
Image-Guided Procedures, Robotic Interventions, and Modeling
- CONFERENCE 12037
Imaging Informatics for Healthcare, Research, and Applications
- CONFERENCE 12031
Physics of Medical Imaging
- CONFERENCE 12038
Ultrasonic Imaging

Participant

Melissa Smith
Assistant Professor
Univ. Arizona

My Schedule Note

- PROGRAM COMMITTEE • CONFERENCE 12031**
Physics of Medical Imaging
20 - 23 February 2022
Town & Country A
- PRESENTER/AUTHOR • PAPER 12031-24**
Single-shot quantitative X-ray imaging using a primary modulator and dual-layer detector: simulation and phantom studies
Sunday, Feb 20 • 4:40 - 5:00 PM
Town & Country A
- SESSION CHAIR • CONF. 12031 - SESSION 4**
Photon-Counting Detector and System
Monday, Feb 21 • 10:40 AM - 12:20 PM
Town & Country A
- AUTHOR • PAPER 12031-28**
Empirical optimization of energy bin weights for compressing measurements with photon counting X-ray detectors
Monday, Feb 21 • 11:00 - 11:20 AM
Town & Country A

Nearby Restaurants
Coffee & Tea

LIST

Map showing locations like Kearny Mesa Community Park, Tecolote Canyon Natural Park and Nature Center, University of San Diego, UC San Diego Medical Center, and San Diego Zoo.

Case Study

American Society of Clinical Oncology



- Founded in 1964, the American Society of Clinical Oncology promotes and provides for
 - Lifelong learning for oncology professionals,
 - Cancer research,
 - An improved environment for oncology practice,
 - Access to quality cancer care,
 - A global network of oncology expertise, and
 - Educated and informed patients with cancer
- ASCO represents more than 42,000 oncology professionals

ASCO's Taxonomy Project



- Worked with Access Innovations to develop six separate thesauri
 - Subject/Topical
 - Drugs
 - Genes
 - Organizational
 - Entities
 - Countries
- Enable ASCO to
 - Internally inventory and manage
 - Hundreds of thousands of pieces of content
 - Across multiple platforms
- Provide targeted retrieval

ASCO's Taxonomy Project

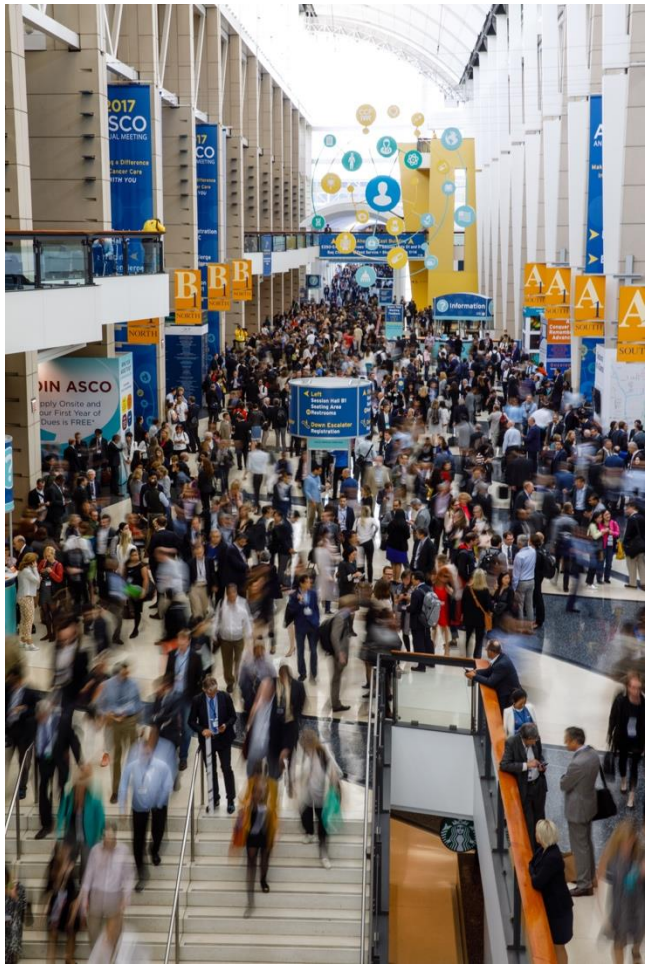


- Enhance search
 - More targeted
 - More accurate results
 - Allow for personalization
 - advertising
- Automated curation based on standardized content characteristics
 - Various sites,
 - Products,
 - Services
 - Suggested papers

Why Provide Session Recommendations

- ASCO's 2016 Leadership Development Program
- Improve attendee Annual Meeting experience
 - Overwhelming choices
 - More than 200 sessions
 - Nearly 2,000 posters
 - 32,000-plus professional attendees
- Suggested offering recommended sessions

ASCO Annual Meeting 2017



Travis Hicks, Using Taxonomy to Drive Personalization: Aligning User Interests and Content, 2018




The Solution: Create Taxonomical Profiles




- Develop an application to
- Generate recommended sessions
- Relevancy by matching
 - Attendee taxonomical profiles
 - Indexed sessions
- Users add their selections
 - To their schedule in the
 - ASCO iPlanner application

Sorting Meeting Tracks into Taxonomical Terms

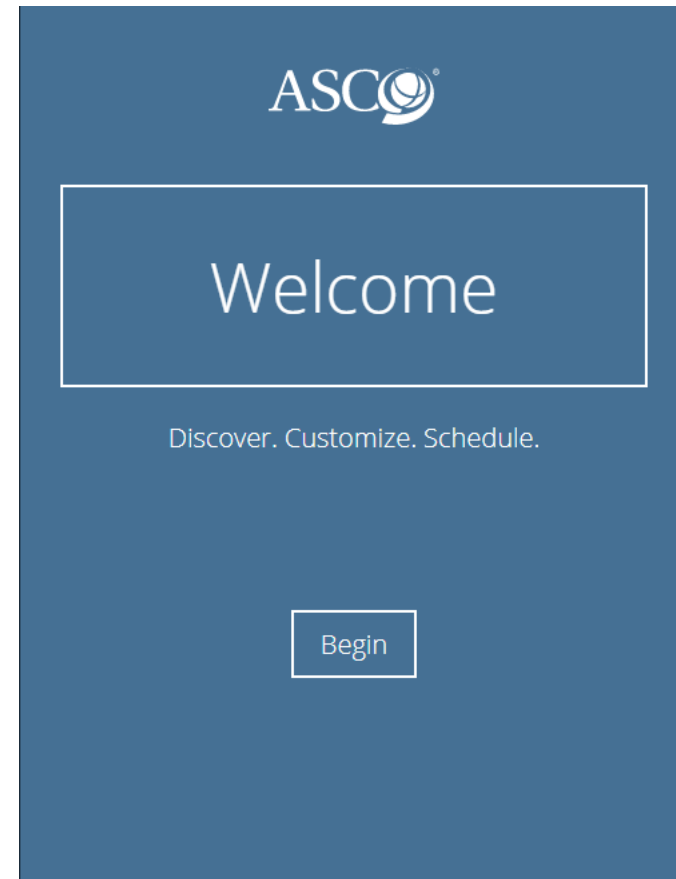
- 
- ASCO mapped each of 30 tracks to its subject thesaurus
 - Access Innovations indexed all Annual Meeting sessions
 - Used subject, drug and genetic thesauri
 - Science sessions indexed
 - terms from abstracts
 - Education sessions indexed
 - Titles
 - Learning objectives

Example of Mapping: 'Breast Cancer' Track

- 
- Breast cancer
 - Bilateral breast cancer
 - Breast lymphoma
 - Breast sarcoma
 - Contralateral breast cancer
 - ER negative breast cancer
 - ER positive breast cancer
 - HER2 negative breast cancer
 - HER2 positive breast cancer
 - Inflammatory breast cancer
 - Invasive breast cancer
 - Invasive ductal breast cancer
 - Invasive medullary breast cancer
 - Invasive micropapillary breast cancer
 - Invasive mucinous breast cancer
 - Invasive papillary breast cancer
 - Invasive lobular breast cancer
 - Ipsilateral breast tumor recurrence
 - Lobular carcinoma
 - Lobular carcinoma in situ
 - Male breast cancer
 - Noninvasive breast cancer
 - Ductal carcinoma in situ
 - Occult breast cancer
 - Phyllodes tumors
 - Triple negative breast cancer
 - BRCA testing

Design of the Session Recommender

- Although browser based, intended to mimic look and feel of mobile applications
- Short questionnaire designed to quickly supplement registration info, gather additional detail
- Because a pilot, built in a feedback mechanism



Example of Mapping: 'Breast Cancer' Track



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- Inflammatory breast cancer
- Invasive breast cancer
- Invasive ductal breast cancer
- Invasive medullary breast cancer
- Invasive micropapillary breast cancer
- Invasive mucinous breast cancer
- Invasive papillary breast cancer
- Invasive lobular breast cancer
- Ipsilateral breast tumor recurrence
- Lobular carcinoma
- Lobular carcinoma in situ
- Metastatic breast cancer
- Metastatic breast carcinoma in situ
- Metastatic breast cancer
- Phyllodes tumors
- Triple negative breast cancer
- BRCA testing



All Synonyms searched

Invasive Breast Cancer

Stage IV Breast Cancer

Matastic Breast Cancer

Online Survey - Interactive Questionnaire

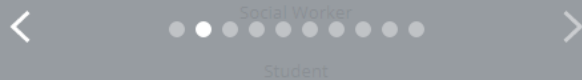


- Develop a taxonomy profile
 - For individual attendee
- Identify appropriate
 - Session types
 - Topics to boost
 - Presentations of interest

What is your current role?

🔍 Type to filter...

- Biostatistician/Epidemiologist
- Business Administrator
- Financial Services Representative
- Genetic Counselor
- Marketing Representative
- Nurse
- Nurse Practitioner
- Office Manager
- Pharmacist
- Physical Therapist
- Physician
- Physician's Assistant
- Psychiatrist/Psychologist
- Researcher
- Sales Representative



Where does your professional activity primarily occur?

- Academic Medical Center/University Administration
- Government Agency
- Laboratory Research**
- Pharmaceutical/Biotechnology Company
- Private Practice (Office or Hospital Based)
- Staff Model HMO
- Training Program (Fellow, Resident, Student)
- Other



Select up to 4 topics of interest.

SELECTED



Type to filter...

- Breast Cancer (+)
- Cancer Prevention, Hereditary Genetics, and Epidemiology (+)
- Care Delivery and Practice Management (+)
- Central Nervous System Tumors (+)
- Developmental Therapeutics and Translational Research** (✓)
- Gastrointestinal (Colorectal) Cancer (+)
- Gastrointestinal (Noncolorectal) Cancer (+)
- Genitourinary (Nonprostate) Cancer** (✓)
- Genitourinary (Prostate) Cancer (+)
- Geriatric Oncology (+)
- Global Health (+)
- Gynecologic Cancer (+)
- Head and Neck Cancer** (✓)
- Health Services Research, Clinical Informatics, and Quality of Care (+)

Refine: Breast Cancer

- Breast cancer (⊗)
- Ductal carcinoma in situ (+)
- ER negative breast cancer (+)
- ER positive breast cancer** (✓)
- HER2 negative breast cancer** (✓)
- HER2 positive breast cancer** (✓)
- Invasive breast cancer (+)
- Triple negative breast cancer (+)

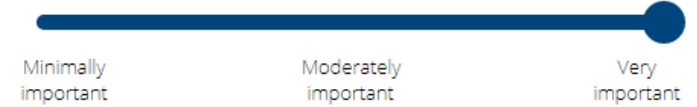
APPLY

Rate how important each topic is to you.

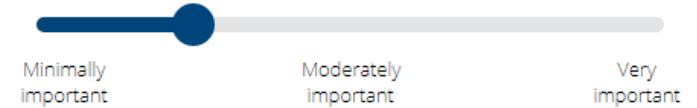
Developmental Therapeutics and Translational Research



Genitourinary (Nonprostate) Cancer




Head and Neck Cancer



Travis Hicks, Using Taxonomy to Drive Personalization: Aligning User Interests and Content, 2018

Example of a Resulting Taxonomical Profile

- 
- Attendee was a Physician who worked at an Academic Medical Center/University
 - Selected topics were:
 - Developmental Therapeutics and Translational Research (5 rating)
 - Hematologic Malignancies—Plasma Cell Dyscrasia = (4 rating)
 - Lung Cancer (5 rating)
 - Melanoma/Skin Cancers (3 rating)
 - Associated interest in Pediatric Oncology
 - No drugs selected

Terms that comprised their taxonomical profile




- Anticancer drugs, Clinical trial access, Developmental therapeutics, Hormonal therapy, Immune cells, Immune checkpoint inhibitors, Immune related adverse events, Immunotherapy, Natural killer cells, Pharmacodynamics, Pharmacokinetics, Programmed cell death protein 1, Programmed death ligand 1, Regulatory T lymphocytes, T cell antigen receptors, T cells, Targeted therapy, Tumor infiltrating lymphocytes
- Multiple myeloma, Plasma cell disorders
- Lung cancer, Non small cell lung carcinoma, Pulmonary small cell carcinoma, Squamous lung cancer
- Melanoma, Merkel cell carcinoma, Mucosal melanoma, Nodular melanoma
- Pediatric oncology

Resulting Query Processed by SOLR

- **q:** subject_thes_session:(("Medicine|Pharmacology|Drugs|Anticancer drugs" OR "Research|Clinical research|Clinical trials|Clinical trial methodology|Clinical trial accrual|Clinical trial access" OR "Treatment|Developmental therapeutics" OR "Treatment|Hormonal therapy" OR "Biology|Immunology|Immune cells" OR "Treatment|Immunotherapy|Immune checkpoint inhibitors" OR "Treatment|Outcomes|Treatment related complications|Adverse effects|Immune related adverse events" OR "Treatment|Immunotherapy" OR "Medicine|Pharmacology|Drugs|Kinase inhibitors" OR "Biology|Immunology|Antibodies|Monoclonal antibodies" OR "Biology|Immunology|Immune cells|Natural killer cells" OR "Medicine|Pharmacology|Pharmacodynamics" OR "Medicine|Pharmacology|Pharmacokinetics" OR "Biology|Immunology|Immune checkpoints|Programmed cell death protein 1" OR "Biology|Biochemistry|Proteins|Programmed death ligand 1" OR "Biology|Immunology|Immune cells|T cells|Regulatory T lymphocytes" OR "Biology|Biochemistry|T cell antigen receptors" OR "Biology|Immunology|Immune cells|T cells" OR "Treatment|Immunotherapy|Targeted therapy" OR "Biology|Immunology|Immune cells|Tumor infiltrating lymphocytes")^7.5 OR ("Cancers|Hematologic malignancies|Plasma cell disorders|Multiple myeloma" OR "Cancers|Hematologic malignancies|Plasma cell disorders")^6 OR ("Cancers|Lung cancer" OR "Cancers|Lung cancer|Non small cell lung carcinoma" OR "Cancers|Lung cancer|Pulmonary small cell carcinoma" OR "Cancers|Lung cancer|Non small cell lung carcinoma|Squamous lung cancer")^7.5 OR ("Cancers|Melanoma" OR "Cancers|Carcinoma|Neuroendocrine carcinoma|Merkel cell carcinoma" OR "Cancers|Melanoma|Mucosal melanoma" OR "Cancers|Melanoma|Nodular melanoma")^4.5)
- **fq:** -fctTopic:"Pediatric Oncology"
- **rows:**30
- **defType:** edismax
- **bq:** (SessionType:* AND Education)^4

Session Recommender Output

- Limited results to max 30 total sessions,
- Default display was relevance,
- Could switch to date
- Users able to
 - add to schedule or
 - delete
 - using the icons to the right
- Can use “Add All” function

Add All to Schedule Sort by 

Featured

 Relevancy Date

SAT JUN 4, 10:30 AM

Opening Session With Fellows of the American Society of Clinical Oncology, Guest Speaker's Address, Presidential Address, ASCO Humanitarian Award, and David A. Karnofsky Memorial Award and Lecture



Hall B1

Opening Session



SUN JUN 5, 02:00 PM

Plenary Session Including the Science of Oncology Award and Lecture



Hall B1

Plenary Session



MON JUN 5, 09:00 AM

Developmental Therapeutics—Immunotherapy



Hall A

Poster Session



FRI JUN 2, 03:45 PM

Expanding the Actionable Landscape: Bladder Cancer Genomics



Arie Crown Theater

Clinical Science Symposium



FRI JUN 2, 02:00 PM

Clinical Problems in Radiation Therapy



E253c

COMPLETE

Syncing with Meeting iPlanner

- Selected sessions
- iPlanner provides
 - Additional session details
 - More functionality
- Available versions
 - Desktop
 - Mobile versions

[iPlanner](#)
Sessions at a Glance ASCO Annual Meeting CE

[HOME](#)
[MY SCHEDULE](#)
[MY COLLECTION](#)

Click here to get recommended sessions based on your interests.

[DOWNLOAD TO PDF](#)
[DOWNLOAD TO EXCEL](#)
[EXPORT TO CALENDAR](#)

Date	Session Time	Session Type	Title	Room
Sat, Jun 3	1:15 PM - 4:45 PM	Poster Session	Patient and Survivor Care	Hall A
Sat, Jun 3	1:15 PM - 4:45 PM	Poster Session	Tumor Biology	Hall A
Sun, Jun 4	8:00 AM - 11:30 AM	Poster Session	Breast Cancer—Local/Regional/Adjuvant	Hall A
Sun, Jun 4	8:00 AM - 11:30 AM	Poster Session	Breast Cancer—Metastatic	Hall A
Sun, Jun 4	11:30 AM - 12:45 PM	Poster Discussion Session	Breast Cancer—Local/Regional/Adjuvant	Hall D2
Sun, Jun 4	4:45 PM - 6:00 PM	Poster Discussion Session	Breast Cancer—Metastatic	Hall B1

After Travis Hicks, Using Taxonomy to Drive Personalization: Aligning User Interests and Content, 2018

Lessons Learned

3,300 attendees

roughly 10 percent of attendees

completed the *Session Recommendation*
question process

Overall, received 88% favorable feedback

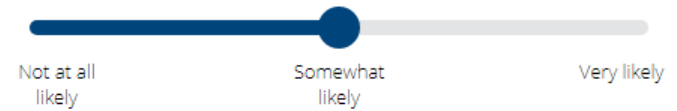
731 positives

102 negatives

Feedback

The ASCO Session Recommender is a pilot program. Please help us improve by providing feedback.

How likely would you be to recommend that other meeting attendees use this tool?



Let us know how we can do better.


We would like to thank the 2016 Leadership Development Program team for recommending ASCO pursue the program and the ASCO Taxonomy Governance Subcommittee for their guidance.

SUBMIT

Usability Findings

- Overall positive feedback on relevancy of results
- Multiple users questioned lack of session details in display
- Multiple users requested ability to select more than 5 topics
- Participants interested in larger number of topics saw rating importance of topics as being more useful
- Multiple users noted displaying class of drugs would be better than selecting specific drugs
- Expected sort by date vs relevancy as default display for results

Next Steps

- 
- ASCO to iterate existing projects and expand into other areas
 - ASCO needs to better standardize and capture individual profile data
 - Aligning questions/values at all locations profile data collected
 - Writing back and synching data in areas previously siloed
 - Create Personalized Profile Database to
 - Power personalization on
 - Multiple applications
 - Websites
 - Store
 - Member/Non-member taxonomy profiles based on interest
 - Activity data (meetings attended, courses taken, articles submitted, etc.)

Profile Database Structure

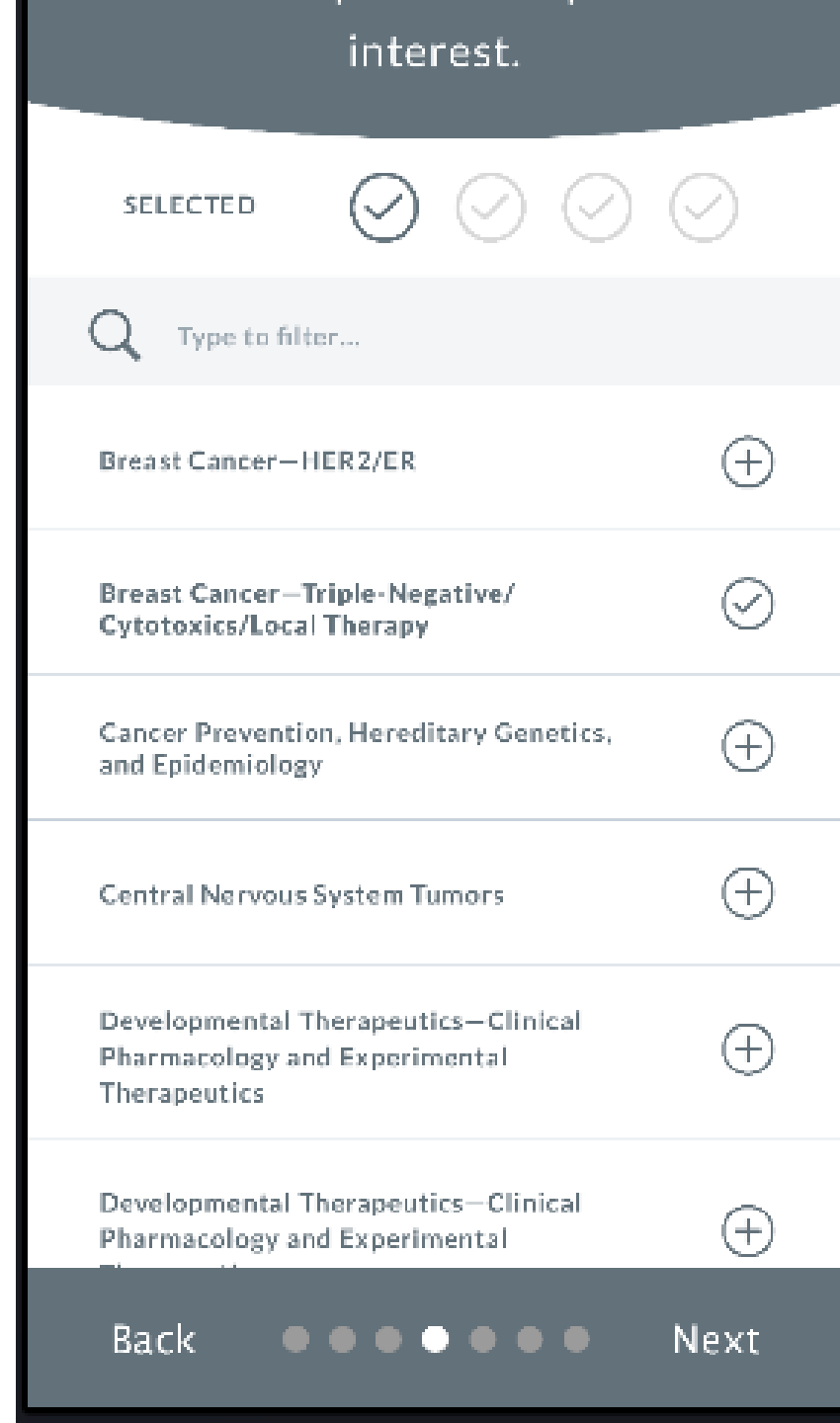
Entity	Data Element Name
Personalization Profile	ASCO ID
Personalization Profile	Country
Personalization Profile	Professional Interest
Personalization Profile	Board Certifications
Personalization Profile	Specialities
Personalization Profile	First Time Attendee
Personalization Profile	Cancer Survivor
Personalization Profile	Pre-Meeting Sessions
Personalization Profile	Professional Role
Personalization Profile	Taxo Terms on Presentation Level
Personalization Profile	Taxo Terms on Session Level
Personalization Profile	Meetings Attended
Personalization Profile	Future Meetings
Personalization Profile	Degree
Personalization Profile	Research Participation
Personalization Profile	Taxonomy profile
Session Recommender	Primary Meeting Interest
Session Recommender	Weights Based On Preference Level
Session Recommender	Drug Categories Based On Preference Level
Session Recommender	Sessions Added to Schedule
Session Recommender	Records Added To Collection
Session Recommender	Conflicting Sessions
Session Recommender	Recommended Sessions Not Used
Application 2	Categories of emails opened
Application 2	Frequency of opens
Application 2	Taxo terms of content clicked on
Application 2	Frequency of clicks

Session Recommender 2.0

New features, changes
to app based on
feedback

Interface Updates

- Use “Back” and “Next” labels
- Update scrollable lists to emphasize that additional options available




New Features

- Display session, presentation and presenter details in results
- Alert when conflicting sessions in suggestions
- Option to run same query against posters


Travis Hicks,
Using Taxonomy to Drive Personalization:
Aligning User Interests and Content, 2018


Session


THU, JUN 1, 1:00 – 2:15 PM | Hall D2
Immunotherapeutic Approaches to Treating Hematologic Malignancies 


Chair(s):
Jason R. Westin, MD, MS, The University of Texas MD Anderson Cancer Center


PRESENTATIONS

THU, JUN 1, 1:00 – 2:15 PM 
Curabitur Labortis Id Lorem Id Bibendum Ut Id Cons
John Doe, MD, MS - Chair
The University of Texas MD Anderson Cancer Center



THU, JUN 1, 1:00 – 2:15 PM 
Curabitur Labortis Id Lorem Id Bibendum Ut Id Cons
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THU, JUN 1, 1:00 – 2:15 PM 
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The University of Texas MD Anderson Cancer Center


THU, JUN 1, 1:00 – 2:15 PM 
Curabitur Labortis Id Lorem Id Bibendum Ut Id Cons
John Doe, MD, MS - Chair
The University of Texas MD Anderson Cancer Center


THU, JUN 1, 1:00 – 2:15 PM 
Curabitur Labortis Id Lorem Id Bibendum Ut Id Cons
John Doe, MD, MS - Chair
The University of Texas MD Anderson Cancer Center


Your Recommendations


 **Alert: Conflicting Sessions** 


THU, JUN 1, 1:00 PM-2:15 PM
Contemporary Active Surveillance for Prostate Cancer: Do We Need Better Imaging and Molecular Testing?
CONFLICT: Genetic and Genomic Testing in Oncology Care

All Done Today 

Extended Education Session 

THU, JUN 1, 1:00 PM-2:15 PM
Controversies in Genetic Evaluation 

Education Session 

THU, JUN 1, 1:00 PM-2:15 PM 

DONE


Flow

- Increase to 5 (from 4) number of topics doctors can select
- Use drug classes as classes rather than individual drugs

Member Personalization

- Goal is to raise awareness of programs/services
 - By matching with interests
- Possibly a specialized content repository
 - Based on expressed interests

Summary

- 
- Reviewed the publication process
 - Emphasis on Conferences
 - ASCO conference app use case
 - AI implementations work well with -
 - Well structured data
 - Taxonomy used in semantic enrichment
 - Conference attendees -
 - Save time
 - Find the most targeted presentations
 - Have a much better conference experience
 - Find like interest profiles

Thank You For Your Attention

Using AI To Deliver Personalized Conference Agendas

NKOS – Toronto October 20, 2024

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Reference and Many Thanks

- **Using Taxonomy to Drive Personalization: Aligning User Interests and Content**, Travis Hicks, Associate Director, Digital Content Strategy, American Society of Clinical Oncology, Data Harmony User Group Meeting, Albuquerque, NM February 6, 2018

Questions

- Are there privacy concerns in this implementation?
- How long does the process take?
- What are the next steps?