

# The TRIG Approach: Progress and Potential

## ISCC In-Person Meeting

**Richard L. Haspel, MD, PhD**  
**Director of Medical Education, Department of Pathology**  
**Beth Israel Deaconess Medical Center**  
**Associate Professor, Harvard Medical School**  
**Chair, TRIG Working Group**



Beth Israel Deaconess  
Medical Center



A teaching hospital of  
Harvard Medical School



# Training Residents in Genomics (TRIG) Working Group

Association of Pathology Chairs



# A structured approach to teaching

1. Form national working group
2. Develop curriculum
3. Implement: workshops
4. Providing tools for others to implement
  - Online resources
  - Train the Trainer sessions
5. Evaluation
  - Workshops
  - Resident in-service exam
6. Dissemination/Research

25 international

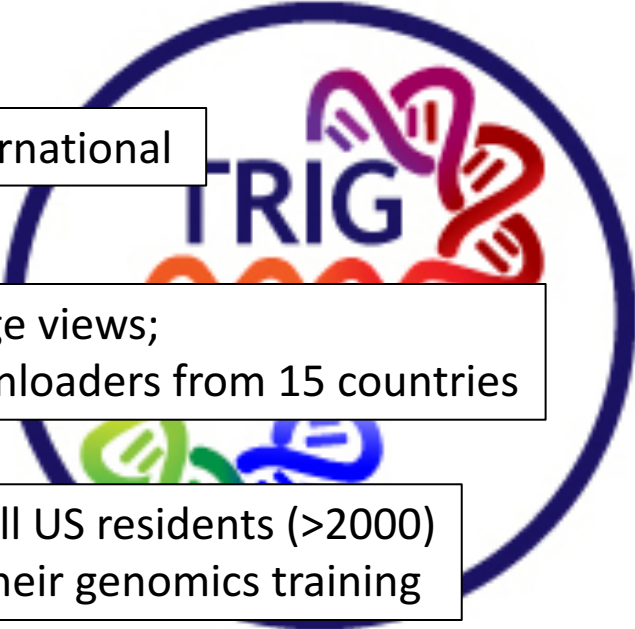
>9000 page views;  
>550 downloaders from 15 countries

Query all US residents (>2000)  
about their genomics training

Obtained \$1.3 million in  
NCI R25 funding

7 TRIG-related publications

Adapted to other specialties



# Curriculum: A breast cancer patient

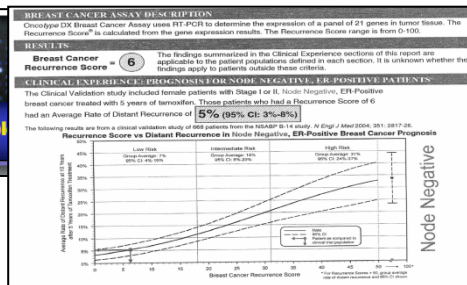


NCBI Resources How To  
ClinVar  
PolyPhen-2  
Home About


**Exercise 1: Single gene testing**



Kaplan-Meier Plotter  
KM plot



**Exercise 2: Prognostic gene panel testing**



COSMIC  
Catalogue of somatic mutations in cancer  
Home Resources Curation

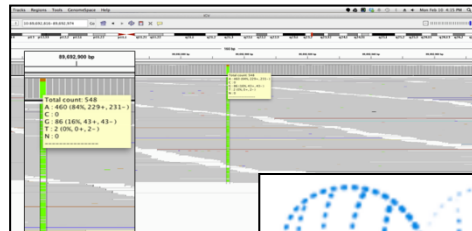


ClinicalTrials.gov  
A service of the U.S. National Institutes of Health

**Exercise 3: Design of a Cancer gene panel**



cBioPortal  
for Cancer Genomics  
HOME DATA SETS WEB API



**Exercise 4: Whole-exome sequencing**



MY CANCER GENOME  
GENETICALLY INFORMED CANCER MEDICINE



ClinGen  
Clinical Genome Resource

# TBL Workshops: Working Together!




## EDUCATIONAL INNOVATION

**Using a Team-Based Learning Approach at National Meetings to Teach Residents Genomic Pathology** *Journal of Graduate Medical Education*, February 1, 2016

# Dissemination: Comprehensive guidance

- 87 page Instructor Handbook
- Workshop lectures
- Handouts/References
  - Pre-workshop
  - Activities
  - Post-workshop
- Peer reviewed
- Downloaders survey (n=67)
  - Used in teaching >1100 trainees
  - All would recommend to colleagues




Core Workshop Educational Methods

Flipped Classroom

The workshop utilizes the *flipped classroom* model, as illustrated below

## The Flipped Classroom



accessible basic **clear** complete comprehensive easy easy-to-use engaging enlightening essemtoa fills-a-gap informative innovative instructor-friendly interactive interesting interesting-questions literate minimal multi-faceted nice **practical** relevant solid thin thorough **timely** up-to-date **useful** user-friendly very-well-organized well-defined well-designed

- In preparing for the workshop, it is most helpful for the instructor to review the handbook, PowerPoint lectures, and handouts together – none of the materials is intended to stand alone. Also, the instructor may choose to review the additional references included in the pre- and post-team-based learning-activity lectures.

# TRIG Curricular Resources

ASCP Pathologists Laboratory Professionals Board of Certification Students Search site

**TRIG** Training Residents In Genomics

Preparing Pathologists for a Leading Role in Genomics  
[Online Genomic Pathology Modules Now Available!](#)

ABOUT WORKSHOPS/COURSES RESOURCES EVALUATION LINKS/LITERATURE

## RESOURCES

With NIH providing approximately \$1.3 million in funding over five years, this grant has allowed the TRIG Working Group to create workshops and courses to further assist residency programs in educating their trainees in genomic pathology.

### Genomic Pathology Workshop Instructor Materials

The TRIG Working Group Resident Genomic Pathology Workshop Instructor Materials are a structured and field-tested introductory resident genomic pathology curriculum for in-person instruction and uses a flipped classroom and team-based learning approach. The curriculum covers pathology, however, a strong background in molecular pathology is recommended.

### Online Genomic Pathology Modules

A series of online modules have been created to simulate a team-based learning (TBL) experience offered at the in-person workshops. The core areas of the TRIG Working Group curriculum are covered: single gene testing; prognostic gene panel testing; design of a multigene

- Testing at 11 residency programs
- Pre-Post test design

# Adaptability: Universal modules through ISCC



NIH National Human Genome Research Institute  
Advancing human health through genomics research

Inter-Society Coordinating Committee for Practitioner Education in Genomics (ISCC)

- [Overview](#)
- [Members](#)
- [Working Groups](#)
- [ISCC Meetings and Activities](#)
- [Resources and Articles](#)
- [Contact](#)

**Overview**

The Inter-Society Coordinating Committee for Practitioner Education in Genomics (ISCC) formed in February 2013 from the [Genomic Medicine IV](#) meeting to

- ISCC Innovative Approaches Working Group: TRIG-based “Universal Modules”
- \$100,000 NHGRI supplement to NCI R25 to develop non-cancer related tools
- Workshops: American Academy of Neurology (April 2016, 2017) American Academy of Ophthalmology (October 2016); American Heart Association (November 2015, 2016)
- Developing Instructor Handbook and Toolkit: Planned ISCC IAWG review
- Other organizations welcome to adapt Universal Modules



# New Initiative: Undergraduate Training in Genomics (UTRIG) Working Group



- Build on TRIG model, develop medical student genomics curriculum
- Test at UMEDS/PRODS medical school sites
- Track progress using the RISE-FIRST
- Recruiting additional organizations
- Applied for R25 grant renewal

# A structured approach to teaching

1. Form national working group
2. Develop curriculum
3. Implement: workshops
4. Providing tools for others to implement
  - Online resources
  - Train the Trainer sessions
5. Evaluation
  - Workshops
  - Resident in-service exam
6. Dissemination/Research

25 international

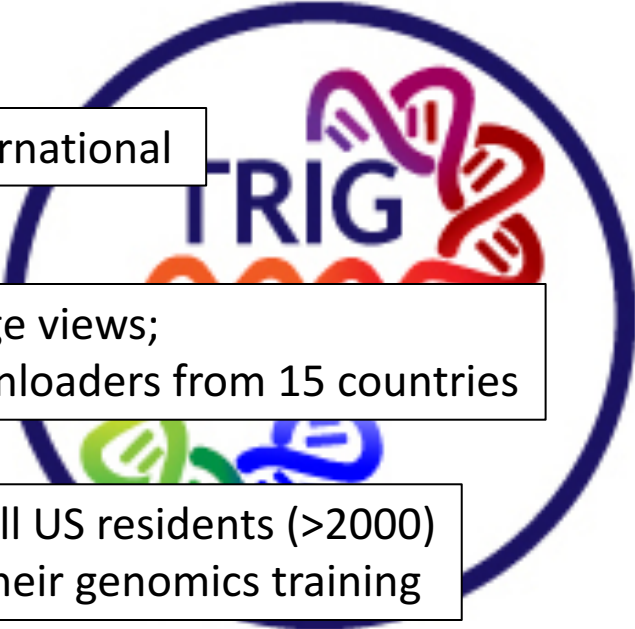
>9000 page views;  
>550 downloaders from 15 countries

Query all US residents (>2000)  
about their genomics training

Obtained \$1.3 million in  
NCI R25 funding

7 TRIG-related publications

Adapted to other specialties



# Thanks!

APC, PRODS Council, UMEDS Council and the TRIG-supporting organizations!!

## TRIG Working Group Members

### Members

- Richard L. Haspel, MD, PhD (Chair)
- Elizabeth Azzato, MD, PhD
- Frederic Barr, MD, PhD
- Andrew H. Beck, MD, MS
- Karen Frank, MD, PhD
- Madhuri Hegde, PhD, FACMG
- Karen Kaul, MD, PhD
- Debra Leonard, MD, PhD
- John Pfeifer, MD, PhD
- Henry Rinder, MD
- Mark E. Sobel, MD, PhD
- VO Speights, MD\*
- Elizabeth Varga, MS, CGC
- Chad Vanderbilt, MD

### Advisors

- Lauren Briere, MS, CGC
- Grace Huang, MD
- Peter Tonellato, PhD
- Loren Joseph, MD

*Supported by an R25 grant from the NCI (1R25CA168544-01) and a supplement from NHGRI*

## NHGRI Supplement Co-Investigators

- Kiran Musunuru, MD, PhD; Veeral Shah, MD, PhD; Timothy Stout, MD, PhD; Jeffery Vance, MD, PhD

## UTRIG

- Rebecca Wilcox PhD (Co-chair)
- Richard L. Haspel, MD, PhD (Co-chair)
- James Atkinson, MD
- Lela Buckingham, PhD, MB(ASCP), DLM(ASCP)
- Shoumita Dasgupta, PhD
- Robin D. LeGallo, MD
- Priscilla S. Markwood, CAE
- Kate Shane-Carson, MS, LGC
- Mark E. Sobel, MD, PhD
- Eric Suarez, CDER, MC, USN
- Laura J. Tafe, MD
- Julia de la Garza, MD

## ASCP Staff

- Eric Parks, Suzanne Ziemnik, Karisa Munoz, Matt Smith, Asma Ali, Michelle Martin, Jay Wagner

# TRIG Curricular Resources

The image shows a screenshot of the TRIG website. At the top, there is a navigation bar with the ASCP logo and links for Pathologists, Laboratory Professionals, Board of Certification, and Students. A search bar is also present. Below the navigation bar, there are two callout boxes. The first callout box, titled 'Future Workshops', lists three items: Pathology: 2017 AACC ASCP, CAP and USCAP Annual Meetings; Other specialties: 2017 AAN Annual Meeting; and Train-the-Trainer: 2017 ACMG Annual Meetings. The second callout box, titled 'Future Goals: Input Welcome!', lists six items: Additional TRIG and UTRIG organizational representation; Developing new cancer-research TRIG-based committee/curriculum; R25 supplement: Develop Instructor Handbook/Toolkit; ISCC IAWG: ideas for new projects, review of Universal Module Handbook/Toolkit (attend our meeting today!); Additional organizations interested in adapting Universal Modules to their specialty; and Additional funding for cancer and non-cancer related genomics education (R25 renewal, NHGRI). In the bottom right corner of the screenshot, there is a red circular stamp that says 'FREE OF CHARGE' and '100% FREE'. Below the callout boxes, there is a photograph of three people in white lab coats looking at a computer screen. At the very bottom of the screenshot, there is a line of text: 'core areas of the TRIG Working Group curriculum are covered: single gene testing; prognostic gene panel testing; design of a multigen...

- **Future Workshops**
  - Pathology: 2017 AACC ASCP, CAP and USCAP Annual Meetings
  - Other specialties: 2017 AAN Annual Meeting
  - Train-the-Trainer: 2017 ACMG Annual Meetings
- **Future Goals: Input Welcome!**
  - Additional TRIG and UTRIG organizational representation
  - Developing new cancer-research TRIG-based committee/curriculum
  - R25 supplement: Develop Instructor Handbook/Toolkit
  - ISCC IAWG: ideas for new projects, review of Universal Module Handbook/Toolkit (attend our meeting today!)
  - Additional organizations interested in adapting Universal Modules to their specialty
  - Additional funding for cancer and non-cancer related genomics education (R25 renewal, NHGRI)

core areas of the TRIG Working Group curriculum are covered: single gene testing; prognostic gene panel testing; design of a multigen