

1

## Endo Skills 2023 Managing Sources of Potential Conflict

- Consideration was given by the Planning Committee to identify when a speaker's personal or professional interest(s) may compete with or have actual, potential, or apparent influence over their presentation.
- Learning objectives were developed by the Planning Committee, responsible for overseeing the program's needs assessment and subsequent content development to ensure accuracy and fair balance.
- Information and/or recommendations in the program are evidence- and/or guidelines-based, and the opinions of the independent speakers will be identified as such.

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2

## Endo Skills 2023: Faculty/Presenter Disclosure

- Presenter: **Rachid Mohamed**
  - Relationships that may introduce potential bias and/or conflict of interest:
    - Grants/Research Support: *None*
    - Speakers Bureau/Honoraria: *Pendopharm, Boston Scientific*
    - Consulting Fees: *None*
- 

3

## Endo Skills 2023 Disclosure of Commercial Support

- This program has received financial support from: **we will send updated publication**
  - Potential for bias/conflict of interest due to commercial support:
    - None*
- 

4

## Objectives

- Highlight evolving / emerging endoscopic technology
  - Explore novel areas of endoscopy development
- 

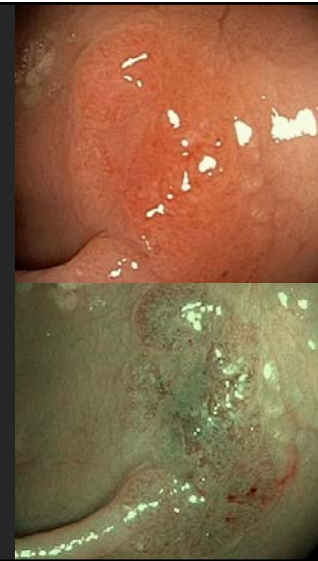
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## Where we are now

- Not to be overlooked
  - High quality, safe diagnostic and therapeutic endoscopy
- 

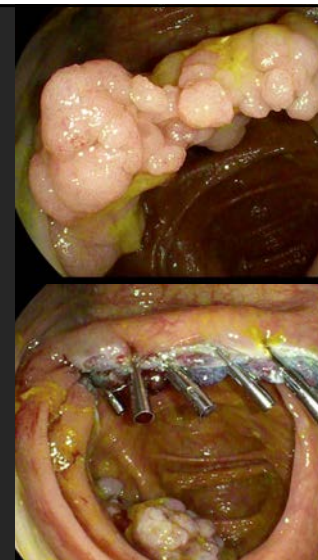
6

Highly accurate  
diagnosis  
capability



7

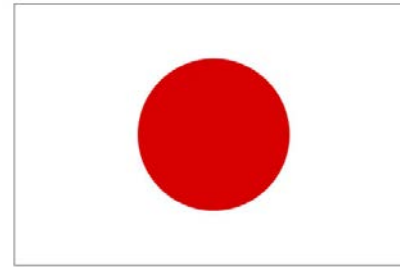
Safe, advanced  
intervention



8

But where are we  
going next?

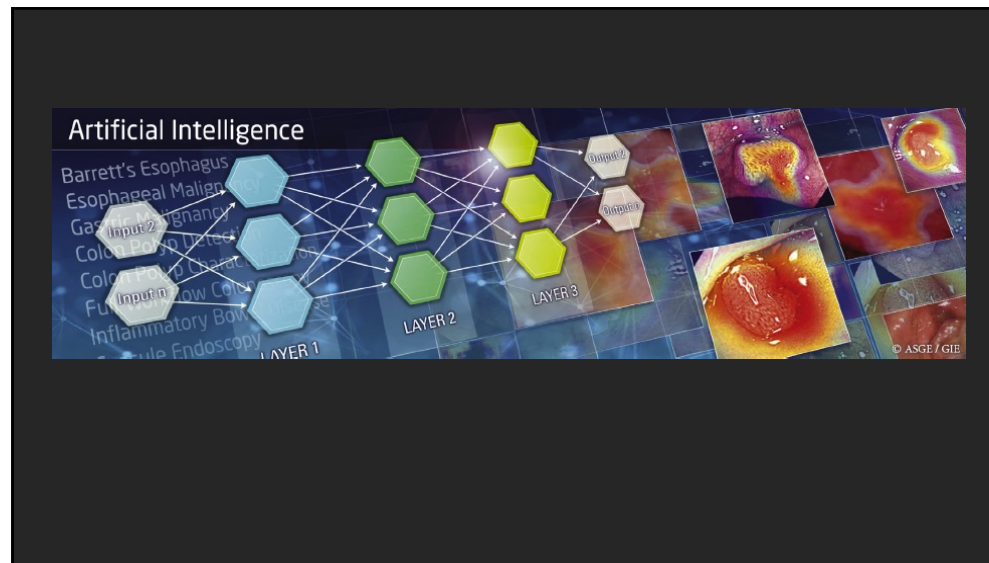
- To see what is on the horizon,  
we may not need to look to the  
future.
- We may only need to  
look.....East!



9

Improved  
diagnosis

10



11

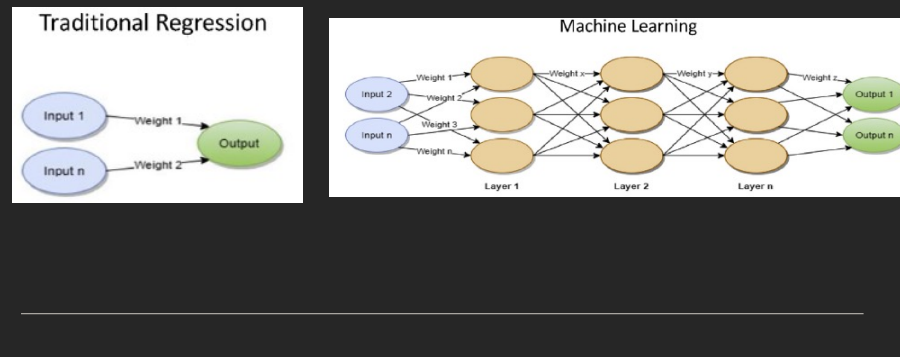
## Artificial Intelligence in Gastroenterology

- Rapidly evolving field with widespread applications
  - *Identification of premalignant and malignant lesions*
  - *Small bowel imaging interpretation with capsule endoscopy*
  - *Characterization of pancreatic cystic lesions*
  - *Development of diagnostic and prognostic scoring systems*
  - *Predicting treatment response and survival outcomes*
  - *Evaluating inflammatory bowel disease and tailoring therapy*
  - *Endoscopy metric and quality outcomes*

12

## So what is AI in GI???

(major disclaimer – I am no expert!)



13

## Colorectal polyp detection

- Adenoma detection remains the single most influential intervention for CRC reduction
- On the whole, adenoma detection is improving
  - *Higher definition optics*
  - *Improvement in bowel preparation*
  - *Employment of adjunct interventions – optical enhancement, distal attachments, dynamic position change*
- However, adenoma detection varies greatly between endoscopists
  - Estimated that 1 in 4 polyps are missed during colonoscopy

Repici. Gastro 2020

14

## Computer Aided Detection (CAD)

- Complimentary system to traditional optical platform
  - Continuous interpretation of image using machine learning modules
  - Identification of potential colorectal neoplasia
- 



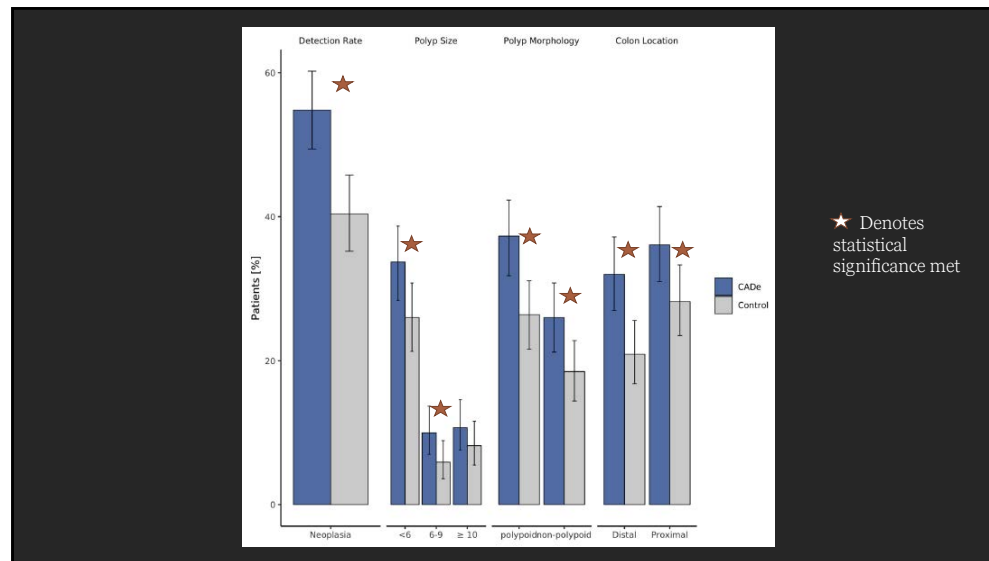
15

## Clinic data

- Multiple studies conducted and published (essentially monthly!)
  - Multicenter RCT in Italy (Repici Gastro 2020)
    - 685 subjects – randomized 1:1 – HD colonoscopy with vs. without CAD system
    - Primary outcome – adenoma detection rate
    - All experienced endoscopists - >2000 screening procedures at baseline
    - Controlled for equipment platform and use of optical enhancement
- 

16





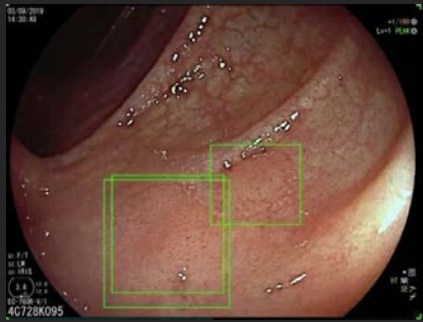
17

## Further details

- No increase in withdrawal time
- Control arm ADR (40%) very much in keeping standard of care
- Low 'false positive' resection  
*Endoscopists maintained control of interpretation and decision to resect*

18

## Influence of endoscopist expertise



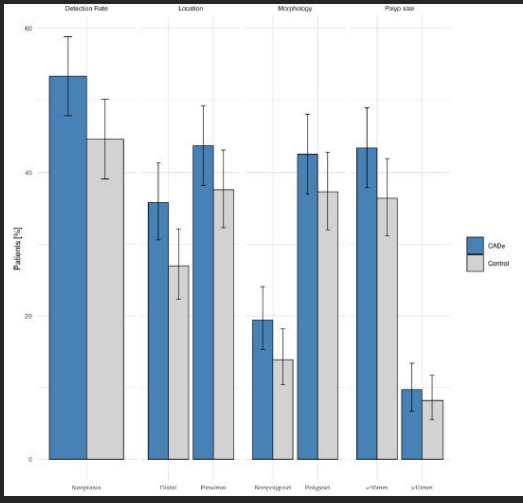
- Follow up study looked at 'non-expert' endoscopists - <2000 total colonoscopies
- Similar format or randomization with CAD + HD vs. HD
- No increase in withdrawal time

Repici Gut 2022

19

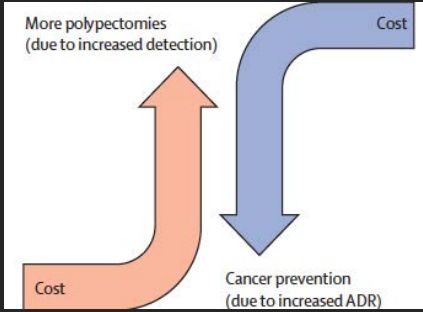
## Results

- Benefit exclusively in non-advanced lesions



Category	CAD+ (%)	Control (%)
Neoplasia	~55	~45
Polyp	~35	~28
Precancer	~45	~38
Non-neoplastic	~20	~15
Polypoid	~45	~38
$≤10mm$	~45	~38
$>10mm$	~10	~8

20



## Cost Analysis

- Does improved adenoma detection result in improved cancer prevention?
- Estimates of incremental cost per colonoscopy with available platforms - \$19

21

## Cost analysis

- Baseline risk of colon cancer in average population – 6%
- Colonoscopy reduces CRC incidence (RR 0.44) and CRC mortality (RR 0.48)
- Colonoscopy *with AI* offer further reduction in CRC incidence – 3.0% vs. 3.3% - and mortality – 1.0% vs 1.1%
- Screening does not have 100% uptake  
*Conservative estimates – 60%*

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Areia M. Lancet Dig Health 2022

22

	No screening	Colonoscopy without AI	Colonoscopy with AI
Colorectal cancer cases per year	148 204	84 463	77 268
Deaths from colorectal cancer per year	56 278	29 342	27 253
Colorectal cancer care cost per year, billion \$	\$10.90	\$6.33	\$5.79
Screening costs per year,* billion \$	..	\$5.13	\$5.38
Total cost per year, billion \$	\$10.90	\$11.46	\$11.17

All costs are in US\$. AI=artificial intelligence. \*Including polypectomies, follow-up colonoscopies, and complications.

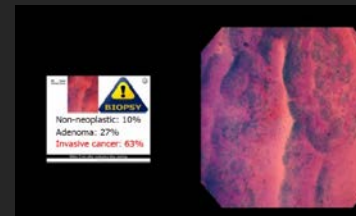
**Table 2: Projection on the US population of the superimposed screening strategies, assuming a 60% adherence to screening colonoscopy among individuals aged 50–100 years**

Areia M. Lancet Dig Health 2022

23

## Can AI do more than just detect?

- Accurate histology interpretation could remove need to resect low risk lesions and save costs on pathology
- CADx platforms for interpretation do exist



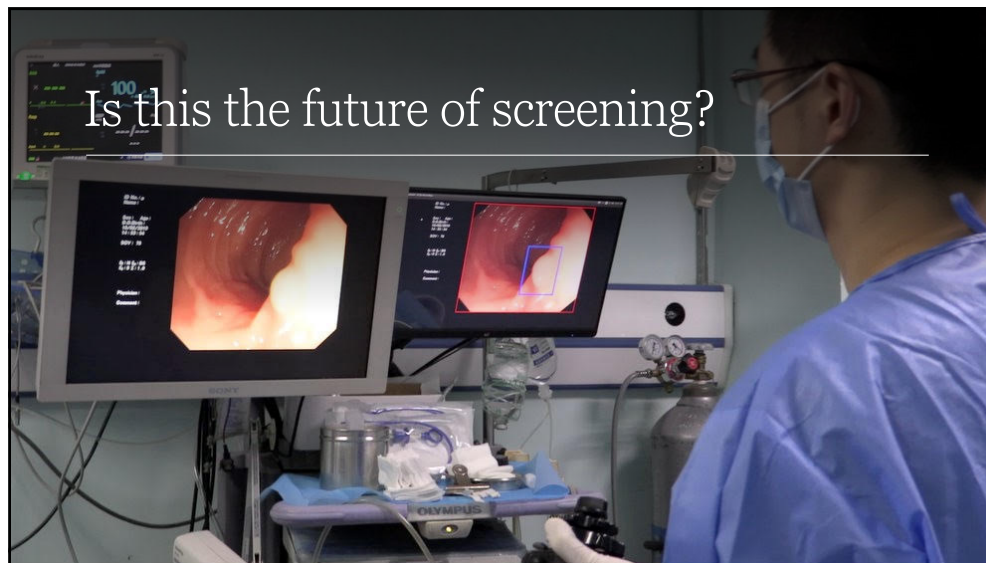
24

## CADx

- Utilizes polyp features to calculate likelihood of neoplastic histology  
*Morphology, vascular pattern/features*
- Modest overall sensitivity (90%) and specificity (70%)
- However, potentially increased accuracy for distal, diminutive lesions

Byrne MF Gut 2019  
Von Renteln World J Gastro 2021

25



26



27

## Patient comfort

- While the majority of patients in Canada receive sedation for endoscopy, a measurable proportion go without
  - Procedural technique, equipment improvements continue to help tolerance
  - Regardless, anxiety / discomfort remains an area for improvement
- 

28

## Virtual reality

- VR has been investigated for anxiety reduction and pain distraction in multiple settings
- Randomization of unsedated colonoscopy procedures to immersive VR or not
- Pain scored on 10 point scale (VAS)
  - VR group had significant reduction in pain vs control (5 vs 7/10)
  - Lower mean HR throughout the procedure with VR
  - Significant voiced satisfaction with the procedure with VR

Liu Q. Clin Med 2022

29



30



31

## Tissue resection

- Significant cognitive and technical effort being put forth to increasing safety and efficacy of neoplasia removal
- Traditional tools have value of familiarity but are limited
  - *Size*
  - *Shape*
  - *"one tool fits all"*

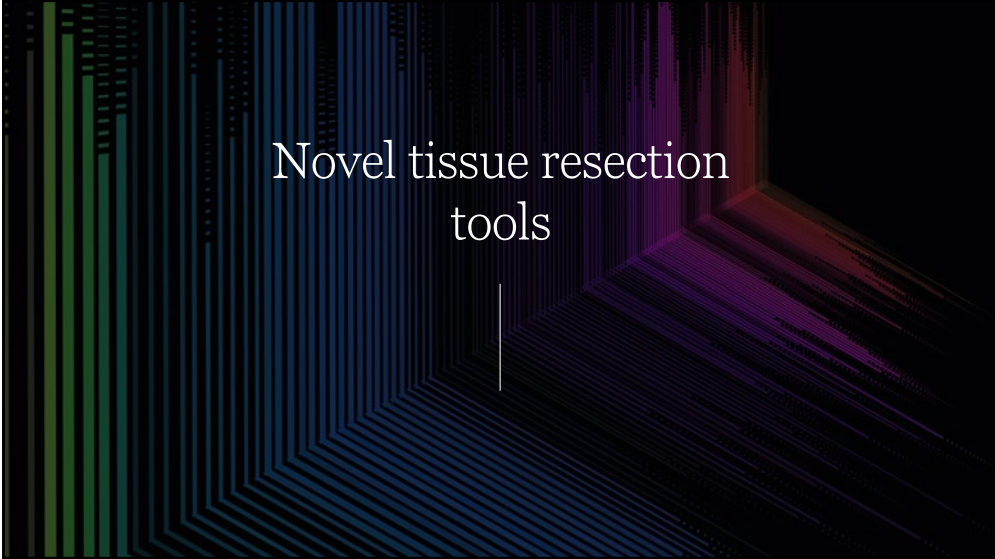
32



## The landscape is changing

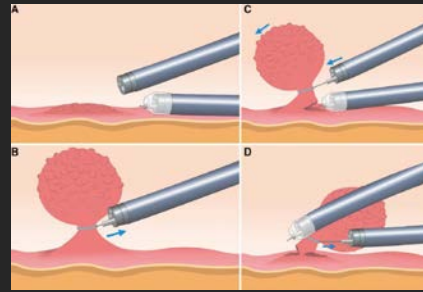
- Continued blurring of advanced endoscopic resection and surgical resection
  - Increasing desire to preserve specimen for accurate pathologic assessment
- 

33

An abstract background consisting of numerous thin, parallel lines in various colors (green, blue, purple, red) that create a sense of depth and perspective, resembling a 3D grid or a tunnel.

## Novel tissue resection tools

34



## Double scope resection.....more of the same tool!

- Involves insertion of two endo/colonoscopes to permit tandem operation and resection of advanced lesions

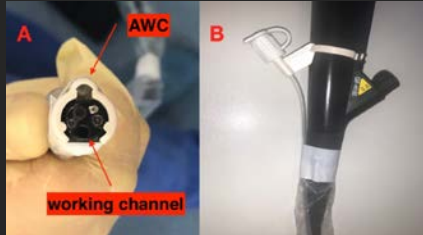
Chou CK. Dis Col Rec 2022

35

## Double scope technique

- Impetus – improve traction of target lesion over traditional gravity traction in ESD
- Small comparative study (n=15) vs. ‘traditional’ ESD of advanced lesions, median 40mm
- Technical success 100% with faster time than traditional method
- Only ‘minor’ pain reported

36

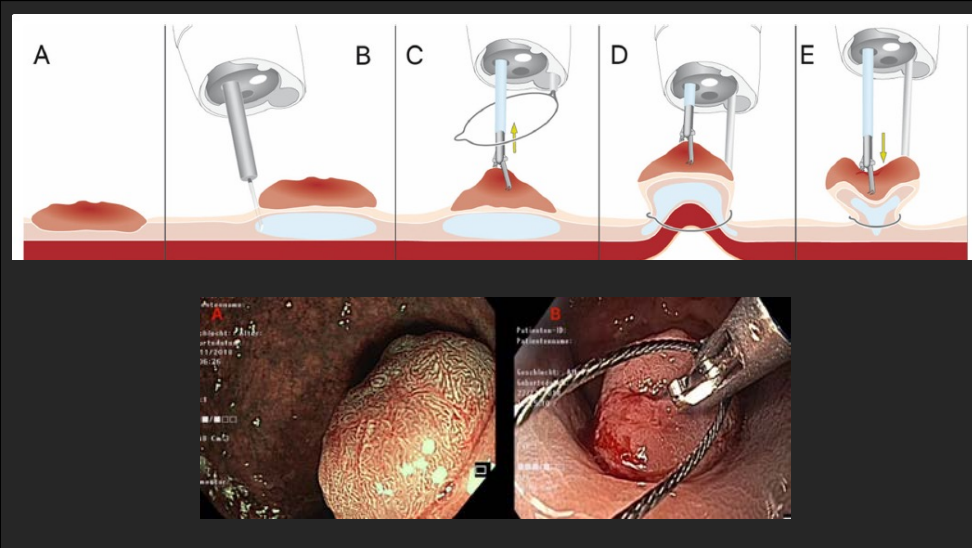


### Maybe we just need more working channels?

- Additional channel could function as 'second scope'
- Allowing simultaneous mechanical traction and resection

*Sportes et al BMC Gastro 2020*

37



38

## Tissue resection - 'simple' ESD

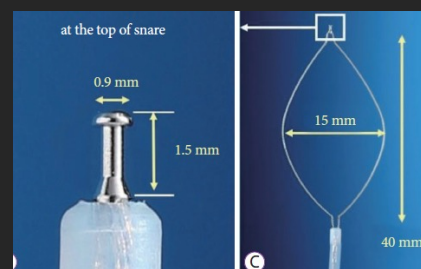
- DISCLAIMER – ESD is not simple!!!
- Rapidly expanding increase in hybrid EMR/ESD

*Permits en bloc resection of larger lesions*

*Employs basic ESD technique with standard snare intervention*

*Might be applicable to more endoscopists*

39



## Novel multifunctional snare - SOUTEN

- Tip of the snare is a knob shaped needle knife for dissection
- Snare opens and functions as traditional snare

Yoshii S. Clin Endo 2020

40

## Hybrid ESD - applicability

- Difficult to determine how widespread
  - Requires dedicated training and understanding of submucosal dissection
  - Will permit more options for complete tissue resection of advanced lesions
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41



## Defect closure

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42



## Management of defect

- As capability of endoscopic resection improves, as should our ability to manage defect and resultant complications

43



## Endosuturing

- Allows for direct apposition of defect margins for secure closure
- Fills a gap for defects too large for management with clipping

44

## Variations of endo suturing

### OVER THE SCOPE

- Accessory apparatus loaded on standard endoscope
- Permits full thickness suture placement
- Possible limitation in more proximal locations due to navigation difficulties
  - *existing device compatible only with gastroscope*

### THROUGH THE SCOPE

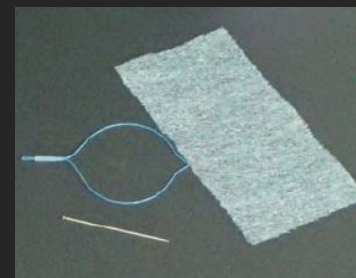
- Instruments passed through the working channel of endo/colonoscope
- Functional lengths for both gastroscopes and colonoscopes
- Pre-loaded 'tacks' anchor into muscularis propria
- Tension of suture approximates tacks and suture cinch is deployed

Zhang LY. GIE 2022

45

## Improving the healing of defects

- Rather than closure of defects, which can impair interpretation of scar for recurrence
- Novel shielding/patching method to promote healing
- Polyglycolic acid
  - *Absorbent suture reinforcement material*
  - *Has established use in major abdominal and thoracic surgery*



46

## Summary

- Continued efforts in neoplasia detection and management
  - Goal to have more general applicability for use
  - Exciting times ahead!
- 

47

Thank you

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A decorative graphic consisting of several overlapping, flowing, green leaf-like shapes that curve and twist across the bottom half of the slide. The leaves have a gradient from light green to dark green and a glossy, 3D appearance.

48