The need

- There are millions who have severe disabilities resulting in complex communication needs (CCN)
- Developmental disabilities
- Acquired disabilities
- Degenerative disabilities

Goals of the session

- To discuss the goals of the RERC on AAC and share our progress to date
- 3 research projects
- 4 development projects
- 5 training and dissemination projects
- To seek input from you as stakeholders regarding our activities to date
- To brainstorm needs and directions for future research, development, training, and dissemination

The partners

- InvoTek, Inc.
  - Tom Jakobs, co-Investigator
- Madonna Rehabilitation Hospital
  - David Beukelman, co-Investigator
  - Susan Fager, co-Investigator
- Oregon Health & Science University
  - Melanie Fried-Oken, co-Investigator
- Pennsylvania State University
  - Janice Light, Principal Investigator
  - David McNaughton, co-Investigator
RERC on AAC
Research projects
Advancing knowledge to improve outcomes

Access R1: Investigating brain computer interface

**Team**
- OHSU: Melanie Fried-Oken
- Betty Parsons
- Brandon Eddy
- Michele Kinnula
- Tab Memmott
- Northeastern: Deniz Erdogmus
- Cognitive Systems Laboratory students

**The Problem**
- Individuals with Locked-In Syndrome have no reliable, consistent access method for communication.
- Visual typing BCI systems require skills including visual acuity and ocular motility, potentially creating barriers to effective use by people with CCN and visual impairments.

**Visual function is frequently impaired in people with LIS**
- Mean visual acuity is 20/60
- Abnormal ocular motility skills present in 77%
- Diplopia present in 46%
- Nystagmus present in 46%
- Abnormal visual fields present in 17%
- Photophobia present in 22%


**Engineering solution**
- **SHUFFLE SPELLER**
- Typing interface
  - Used here with noninvasive SSVEP BCI, but could work with other access methods
- Integrated language model
- Multiple queries per selection
- Greater uncertainty → more questions
- Robust to errors
Access R1: Investigating brain computer interface

Research question
- How do simulated visual acuity and ocular motility impairments affect Shuffle Speller BCI performance in healthy adults?

Design: Use SSVEP
- Steady-state visually-evoked potential
- Brain response to oscillating visual stimulus (e.g., flashing light)
- Measured over visual cortex
- Can be measured with noninvasive electrodes
- High signal-to-noise ratio

Independent variable: CONDITION
1. Unimpaired
2. Simulated acuity impairment (20/200 goggles)
3. Simulated motility impairment (fixation circle)

Dependent variables
1. Accuracy (correct selections/total selections)
2. Typing speed (characters per minute)
3. User experience
   • Comfort & Workload
   • Satisfaction

Hypotheses
- Simulated visual acuity impairment will have little effect on Shuffle Speller BCI performance
- Simulated ocular motility impairment will significantly affect performance
- Few people will be able to type
- Those who can type will experience slower speeds

Experiment
- Crossover design
- Each participant copy-spells 10 words with Shuffle Speller under each condition
- 3 data collection visits
- Randomized condition order

Participants for Phase 1:
- 38 healthy controls
- Aged 37 ± 15
- Passing score on Telephone Interview for Cognitive Status
- Corrected visual acuity 20/40 or better
- Screening indicates no deficits in visual field or ocular motility

Participants for Phase 2:
- Individuals with severe speech and physical impairments secondary to Locked-In Syndrome
Access R1: Investigating brain computer interface

**COPY-SPELL ABILITY**

All participants could copy-spell with simulated visual acuity impairment of 20/200.

<table>
<thead>
<tr>
<th>Condition</th>
<th>Participants Who Typed 1+ Words</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unimpaired (n=38)</td>
<td>38</td>
</tr>
<tr>
<td>Visual Acuity (n=38)</td>
<td>38</td>
</tr>
<tr>
<td>Ocular Motility (n=37)</td>
<td>6</td>
</tr>
</tbody>
</table>

* eye tracker could not be calibrated for one participant

**SELECTION ACCURACY**

Accuracy unaffected by simulated visual acuity impairment

Accuracy was high for 6 participants who could spell with reduced motility

**User experience (N=38)**

- Unimpaired and acuity conditions:
  - Low workload
  - Low discomfort
  - High satisfaction
- Motility condition (regardless of typing success):
  - Higher workload
  - Greater discomfort
  - Lower satisfaction
Access R1: Investigating brain computer interface

**Implications**
- Acuity impairment of 20/200 (legal blindness) is not an obstacle to Shuffle use
- Some people may be able to use Shuffle with reduced ocular motility

**Next Steps**
- Test Shuffle Speller BCI with PSSPI
- Conduct visual simulation experiment with PSSPI
- Compare and add multi-modal access methods (eyegaze)

Lang Tech R2: Investigating AAC technologies to support literacy

**Team**
- Penn State/InvoTek/Saltillo

**The problem**
- More than 90% of individuals with CCN enter adulthood without literacy skills (Foley & Wolter, 2010)
- Current AAC technologies do not support the transition from graphic picture symbols to literacy

Transition to Literacy (T2L) Software Features

**Transition to literacy (T2L) software feature**
- Individual selects a picture symbol from AAC display
- Written word appears dynamically
- Written word is spoken by the app

**2 apps**
- Grid-based T2L app developed by Saltillo (Hershberger)
- VSD T2L app developed by InvoTek (Jakobs)
- Incorporated into SnapScene by TobiiDynavox

T2L feature for AAC apps

**A first step in the transition to literacy**

**T2L apps are intended to complement, not replace** literacy instruction

**Current T2L apps**
- only support sight word acquisition
- are a first step in technologies that provide a direct bridge from picture-based systems to literacy

**Future developments are required to further support the full transition to literacy**
Results

Increased identification of words as a result of utilizing the VSD T2L app
Success reading single words generalized to novel photos

Efficiency of intervention (Caron et al., 2016)

<table>
<thead>
<tr>
<th>Participant</th>
<th># of intervention sessions</th>
<th># of exposures to each written word</th>
<th>Total exposure time per word (in sec)</th>
</tr>
</thead>
<tbody>
<tr>
<td>J</td>
<td>8</td>
<td>32</td>
<td>96 sec</td>
</tr>
<tr>
<td>N</td>
<td>5</td>
<td>20</td>
<td>60 sec</td>
</tr>
<tr>
<td>W</td>
<td>6</td>
<td>24</td>
<td>72 sec</td>
</tr>
<tr>
<td>D</td>
<td>6</td>
<td>24</td>
<td>72 sec</td>
</tr>
<tr>
<td>T</td>
<td>6</td>
<td>24</td>
<td>72 sec</td>
</tr>
</tbody>
</table>

HCI R3: Investigating cognitive processing demands of AAC interfaces

+ Engineering solution
  + Define display characteristics that affect visual cognitive processing demands
  + Determine optimal designs for AAC displays to maximize communication

 HCI R3: Investigating cognitive processing demands of AAC interfaces

+ Research methods
  + Series of studies to investigate visual cognitive processing demands of different display characteristics with individuals with CCN
  + Eye tracking research methods
Studies with adults with CCN

Rationale

- Visual Scene Displays (VSD) are increasing used to support communication for children and adults with complex communication needs.
- Mobile technology contains cameras to capture “the moment”
- Many SGD can efficiently manage VSDs by onboard cameras, access to the web, and memory files
- Web-based image resources (Google Image)

Purpose

- The purpose of this study was to investigate the eye tracking patterns of adults with and without disabilities who were cued to identify a VSD that represented activities such as:
  - Sleeping
  - Eating
  - Drinking
  - Writing
  - Reading

HCI R3: Investigating visual cognitive processing demands of AAC interfaces

Selecting Visual Scene Displays: Personal relevance

Age and gender

Web-based Resources
Procedures

- Equipment: Eye-Tracking with T-60 (Tobii)
- Stimuli: Screens containing 4 VSDs with adults of 3 age groups engage in an activity

Results: Women Participants Images of Young and Senior Women & Men

<table>
<thead>
<tr>
<th></th>
<th>Female</th>
<th>Male</th>
</tr>
</thead>
<tbody>
<tr>
<td>Young</td>
<td>90.9%</td>
<td>9.1%</td>
</tr>
<tr>
<td>Middle-aged</td>
<td>59.9%</td>
<td>40.1%</td>
</tr>
<tr>
<td>Older (Senior)</td>
<td>85.5%</td>
<td>14.5%</td>
</tr>
</tbody>
</table>

+ Young and older women fixated primarily on women of their age group. Middle-aged women were influenced by lack of images of their age group.

Results: Young Male Participants Images of Women & Men

<table>
<thead>
<tr>
<th></th>
<th>Female</th>
<th>Male</th>
</tr>
</thead>
<tbody>
<tr>
<td>Young Males</td>
<td>24%</td>
<td>76%</td>
</tr>
</tbody>
</table>

+ Young men focused on male as compared to female images. Ongoing data collection for older men.

Results: Men and Women with Stroke

<table>
<thead>
<tr>
<th></th>
<th>Female</th>
<th>Male</th>
</tr>
</thead>
<tbody>
<tr>
<td>Males</td>
<td>0%</td>
<td>100%</td>
</tr>
<tr>
<td>Women</td>
<td>80%</td>
<td>20%</td>
</tr>
</tbody>
</table>

Ongoing data for men and women with stroke.
The purpose of this study was to investigate the eye tracking patterns of adults with and without disabilities to were cued to identify a VSD that represented activities in vertical and horizontal menu bars.

Results: Young and Middle-aged Women, Individuals with Stroke - First Fixation on Top or Left Menu bar

<table>
<thead>
<tr>
<th>Women</th>
<th>Top</th>
<th>Left</th>
</tr>
</thead>
<tbody>
<tr>
<td>Young women</td>
<td>63%</td>
<td>37%</td>
</tr>
<tr>
<td>Middle-aged women</td>
<td>67%</td>
<td>33%</td>
</tr>
<tr>
<td>Young Men</td>
<td>72%</td>
<td>28%</td>
</tr>
<tr>
<td>Individuals with Stroke &amp; TBI</td>
<td>60%</td>
<td>40%</td>
</tr>
</tbody>
</table>

Conclusions

They tend to fixate initially on the top menu bar are leaving the main image.
Future Directions

- Focus on visual attention to symbols routinely used in patient provider care
- Use of video VSD for patient provider communication and staff training

HCI R3: Investigating cognitive processing demands of AAC interfaces

- Expected outcomes
  - Scientifically-based design specifications for AAC displays for children & adults with CCN
  - Minimize cognitive demands
  - Maximize communication

Access D1: Developing multimodal access technologies

- Team
  - InvoTek, Inc., Madonna, Penn State, Saltillo
- The problem
  - Focus has remained on single access methods despite advances in access technologies (eye/head tracking, touch interfaces, specialty switches)
  - Challenges with focusing on a single access method
  - Fatigue due to over-use
  - Inefficiency
  - Heavy reliance/focus on methods such as dwell that require vigilance and precise motor execution
  - Some access methods require optimal set-up, positioning and environmental conditions to be relied on exclusively as an access method

RERC on AAC Development projects
Access D1: Developing multimodal access technologies

+ Goals of the project
  • Design multi-modal technology so that the multiple access method are available.
  • Minimize the shortcomings of a single access method.

Access D1: Developing multimodal access technologies – Eye tracking + Scanning Prototype

+ Eye tracking identifies “cluster” of letters
+ When target letter is in the highlighted “cluster”, user activates a switch
+ All letters within the “cluster” are then scanned, user activates switch when target letter is reached
+ Letter is then inserted into message window

Access D1: Developing multimodal access technologies

+ Engineering solution
  + Development of prototype eye tracking + switch scanning system
Access D1: Developing multimodal access technologies – Clinical Evaluation

+ 2 primary groups
  + Group 1: Individuals with SCI and/or tetraplegia due to other conditions
    + Exploration of multimodal system as alternative access option due to challenges experienced consistently using eye tracking
    + Example: tech dependent group that is often highly mobile (multiple positioning environments that make eye tracking difficult) and often have medical complications (bed rest for wound healing is challenging position for successful eye tracking access through out the day)
  + Can eye track- only under optimal settings
  + Group 2: Individuals who rely on AAC (e.g., CP, brainstem stroke)
    + Exploration of multimodal system as alternative access option due to poor performance using eye tracking

Preliminary results: Case Illustration

+ Participant description
  + Brainstem stroke (3 months post onset)
  + Tetraplegic with emerging hand movement
  + Significant oculomotor control challenges with spot patching on glasses required for diplopia
  + Challenges with eye tracking due to eye motor control deficits

Preliminary results: Accurate characters per sentence

<table>
<thead>
<tr>
<th>% Accuracy</th>
<th>Accurate characters per sentence (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0%</td>
<td>Multimodal</td>
</tr>
<tr>
<td>10%</td>
<td>Multimodal</td>
</tr>
<tr>
<td>20%</td>
<td>Multimodal</td>
</tr>
<tr>
<td>30%</td>
<td>Multimodal</td>
</tr>
<tr>
<td>40%</td>
<td>Multimodal</td>
</tr>
<tr>
<td>50%</td>
<td>Multimodal</td>
</tr>
<tr>
<td>60%</td>
<td>Multimodal</td>
</tr>
<tr>
<td>70%</td>
<td>Multimodal</td>
</tr>
<tr>
<td>80%</td>
<td>Multimodal</td>
</tr>
<tr>
<td>90%</td>
<td>Multimodal</td>
</tr>
<tr>
<td>100%</td>
<td>Multimodal</td>
</tr>
</tbody>
</table>

Errors per sentence

<table>
<thead>
<tr>
<th>Number of Errors</th>
<th>Errors per sentence</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Multimodal</td>
</tr>
<tr>
<td>1</td>
<td>Multimodal</td>
</tr>
<tr>
<td>2</td>
<td>Multimodal</td>
</tr>
<tr>
<td>3</td>
<td>Multimodal</td>
</tr>
<tr>
<td>4</td>
<td>Multimodal</td>
</tr>
<tr>
<td>5</td>
<td>Multimodal</td>
</tr>
</tbody>
</table>
Future Directions

- Systematic studies comparing single vs. multimodal access strategies (alternating treatment design)
- Trials of other combinations of access methods
- Saturday, 9:20
- Bonaire 6

Lang Tech D2: Developing technologies with video visual scene displays

- Team
  - Penn State, InvoTek
- The problem
  - Many individuals with CCN benefit from visual scene displays (VSDs)
  - Current AAC apps with VSDs are limited to static photo VSDs; fail to capture dynamic events
  - Video offers potential to capture dynamic events but current AAC technologies only support passive video viewing

Lang Tech D2: Developing technologies with video visual scene displays

- Engineering solution
  - Capture video of daily routines
  - Via built-in cameras & wireless import
  - Allow pause of video
  - Create VSDs at these junctures
  - Create hotspots with speech output

Lang Tech D2: Developing technologies with video visual scene displays

Babb, Gormley, Light, & McNaughton (2018)

- 18 year old male with autism
- High school student
- No functional speech
  - A few signs – mostly yes/no, thank you
- Prompt dependent

- Local elementary school library
  - 3 tasks – Checking in books, putting away/sorting books, and making dye cuts
Task Analysis: Putting Books Away

1. Ask to put the books away: **Can I put the books away?**
2. Pick up the box of books
3. Bring the box to the table
4. Empty the books on to the table
5. Sort the books into piles based on categories

Results: Putting Away Books/Sorting

Results: Putting Away Books/Sorting
Salena Babb will present Friday at 4:30 – 5:30 pm, Curacao 4

RERC on AAC Partner Disclosures

- Melanie Fried-Oken receives a salary from the Oregon Health Sciences University and has research grants from NIH and NIDILRR. She has no personal disclosure to report.
- Tom and Erik Jakobs are paid employees of InvoTek, Inc.

Access D3: Developing AAC technologies with smart prediction

- Team
  - Invotek: T Jakobs
  - Erik Jakobs
  - OHSU: M Fried-Oken
  - Michelle Kinsella
  - Rebecca Pryor

- Challenge
  - Using an AAC spelling device to type out messages during spontaneous conversation is very slow. The rate of message production violates verbal interaction rules, leading to isolation or impoverished communication of AAC users.

- Goal
  - To increase the speed of message generation in an AAC spelling device and the engagement of communication partners by relying on the knowledge of a partner during conversation.
Access D3: Developing AAC technologies with smart prediction

+ Research Question
Can we develop a novel dual-app AAC system that enables a person with severe speech and physical impairments to produce messages faster while still maintaining control over expression and increases engagement of the partner during conversation?

+ Targeted Users
Literate individuals with severe speech and physical impairments who use AAC devices with single switch scanning, and their care or communication partners.

+ Current Efforts
Improve SBIR CoConstruct prototype within RERC SmartPredict project. SBIR ended in May 2016.

Targeted Users
Literate individuals with severe speech and physical impairments who use AAC devices with single switch scanning, and their care or communication partners.

Current Efforts
Improve SBIR CoConstruct prototype within RERC SmartPredict project. SBIR ended in May 2016.

Materials:
- 2 Samsung Galaxy tablets connected by Bluetooth®
  - CoConstruct-AAC app for the AAC user
  - Partner app for the familiar partner
  - CoConstruct-AAC app interface:
    - QWERTY keyboard with two lines above the keyboard:
      - Message line
      - Word prediction from language model system
  - Partner app interface:
    - QWERTY keyboard and 2 lines:
      - Message line
      - Word prediction line from CoConstruct-AAC app

CoConstruct-AAC app functionality:
- As an AAC user types with the CoConstruct-AAC app, the text appears in the message line and in the partner’s tablet message line.
- The partner can suggest a word or phrase started by the AAC user by typing in the partner app. The suggestions are sent to the word prediction line of the CoConstruct-AAC app.
- The AAC user does not know which words are from the CoConstruct-AAC word prediction system and which are from the partner suggestions to maintain user autonomy.

Clinical Evaluation of CoConstruct
- Single case research ABAB alternating treatment design
- 5 subjects with CNN: 3 direct selectors; 2 scanners
- Subjects described 3 pictures with and without partner assistance
- DV: Words/minute; selections/minute; selections/word in 10 minutes

Results
CoConstruct partner app shows trends toward improving speed of message production by:
- Slight increase rate of word production in 10 minute period.
- Slight decrease in number of selections needed in a 10 minute period for one picture.
- Slight decrease in number of selections per word needed with direct selection and scanning access.
Access D3: Developing AAC technologies with smart prediction

Improvements to SmartPredict
1. Use the COCA language model to also predict trigrams.
2. Evaluate with users who rely on switch scanning.
3. Handle near-miss predictions and the creation of story prediction databases from text documents.
4. Add the option to always display the partner’s prediction in the word prediction list.
5. Display the UI for the AAC user on the partner’s app.
   - This provides a lot of information to the partner during scanning.
   - Words in the word prediction list that are not chosen
   - Letters during scanning that are passed up

Add a new variable:
Partner engagement

Our work to date indicates that we need to learn more about the partner’s experience. What can we learn about the partner’s experience during conversation with a person who relies on switch scanning for message generation?

Research Questions
During conversations about a shared experience:
1. Are differences observed in level of partner engagement with and without the Smart Predict app?
2. Are differences observed in AAC user message efficiency with and without the Smart Predict app?
3. Are differences observed in AAC user & partner workload and satisfaction with and without the Smart Predict app?
Access D3: Developing AAC technologies with smart prediction

**Design**
- Single case ABAB withdrawal design
- 5 literate adults with CCN who use switch scanning paired with 5 partners for 20 conversations
- Watch videos and discuss topic for 15 minutes.

**Dependent Variables**
- Partner engagement (on/off task behaviors)
- Message efficiency (selections/turn)
- User/partner satisfaction
- User/partner workload

**Expected Tech Transfer Outcomes**
- The SmartPredict co-construction concept should appear in every device as we harness contextual information and vocabulary within new technologies for people who rely on SGDs.
- Every SGD should have the capability of adding vocabulary options from a knowledgeable partner into the word prediction function. The person with CCN will always have the choice to select or ignore the vocabulary so autonomy and independence are maintained.
- An accompanying device should provide additional vocabulary into the lexicon of every SGD.

Access D4: Developing a Cognitive Demands Checklist for AAC Technologies

**Team**
- Oregon Health & Science U.

**The problem**
- Communication technology should be matched to the cognitive needs and abilities of the user
- Current feature matching tools do not address the cognitive demands of AAC use
- Limited research published regarding the cognitive demands of AAC technologies and apps

**Our goal:**
- Develop, evaluate, and distribute the Cognitive Demands Checklist for AAC (CDC4AAC)
- Base this tool on evidence from AAC and cognition research
- Assist clinicians with person-technology matching
- Help developers understand the cognitive demands of AAC technologies and design improved products
**HCI D4: Developing a Cognitive Demands Checklist for AAC Technologies**

+ **Clinical evaluation and testing**
  + **AAC:** Examined feature lists for existing AAC devices and software/apps.
  + Validated 4 AAC categories through national consensus:
    - **Access** (direct/indirect)
    - **Display** (navigation, color, grid size, use of VSD….)
    - **Language** (representation, organization, rate enhancement)
    - **Output** (visual, auditory, tactile)
  + **Cognition:** Examined cognitive domains critical for AAC and validated through national consensus.
  + Chose to focus on 3 cognitive skills critical to AAC technologies:
    - **Attention**
    - **Memory**
    - **Executive Function**

---

**Access D4: Developing a cognitive demands checklist**

+ **Progress to date**
  + CDC4AAC has been developed.
  + Completing systematic literature review for each feature.
  + Planning feedback survey to administer to 60 stakeholders:
    - People who rely on AAC
    - Clinicians
    - Developers

---

**HCI D4: Developing a Cognitive Demands Checklist for AAC Technologies**

1. **Conducted systematic literature review using guidelines**
   + **Key words:** Attention, Memory or Executive Function + designated feature. i.e.: memory and direct selection for AAC
   + **Recent evidence:** within past ten years UNLESS sentinel article
   + **Consensus:** Each article read independently by 2 team members, annotating relevant citations then verifying through consensus process

2. **Developed website and created an interactive tool**
   + Provide information about cognitive demands as user selects feature, based on current research evidence.
   + Produce a final synthesis report of identified features and their cognitive demands, substantiated by current evidence.
**HCI D4: Developing a Cognitive Demands Checklist for AAC Technologies**

- **Final report;**
- **Links to references and comprehensive bibliography**

**Expected outcomes of the CDC4AAC**
- Web-based application
- Available on multiple websites
- Free of charge to AAC stakeholders
- Marketed through AAC stakeholder groups and industry conferences
- Added to GPII shelf of Raising the Floor Consortium
- Broad accessibility (universal design)
RERC on AAC
Training & dissemination

Training & Dissemination

+ Professionals (pre-service and in-service)
+ Persons with complex communication needs
+ Family members

Who are the materials for?

AAC-Learning-Center.psu.edu
Who are the materials for?

- personal information
- university teaching
- to share with educational personnel
- to share with people who use AAC/family member

AAC-learning-center.psu.edu

Resources

Courses

webcasts, readings, factsheets

Structured content, quizzes

Free registration

Quizzes & discussion topics

<table>
<thead>
<tr>
<th>Topic</th>
<th>Contributors</th>
<th>Target date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Funding - Overview</td>
<td>David McNaughton, Dana Brinkel, Lox Golinker, Rachel Weintraub</td>
<td>Fall 2018</td>
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<tr>
<td>Funding - Funding requests</td>
<td>David McNaughton, Dana Brinkel, Lox Golinker, Rachel Weintraub</td>
<td>Fall 2018</td>
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<tr>
<td>Alternative Access</td>
<td>Jessica Gormley, David McNaughton, Naima Bhana</td>
<td>Fall 2018</td>
</tr>
<tr>
<td>Literacy - Instruction in early reading skills</td>
<td>Janice Light, David McNaughton, Jess Caron, Grace Chang</td>
<td>Fall 2018</td>
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<tr>
<td>AAC in schools - Family centered practices</td>
<td>Kelsey Mandak, Janice Light, David McNaughton</td>
<td>Summer 2018</td>
</tr>
<tr>
<td>Transition - Building Community</td>
<td>David McNaughton, Chris Klein</td>
<td>Summer 2019</td>
</tr>
<tr>
<td>AAC and in-patient settings</td>
<td>Jessica Gormley</td>
<td>Summer 2019</td>
</tr>
</tbody>
</table>
Outcomes of the RERC on AAC to date

+ Initiated 17 new research studies to advance knowledge and improve outcomes for individuals with CCN
+ Developed 5 new engineering solutions to advance AAC technologies and improve outcomes for individuals with CCN
+ Mentored a total of 89 students in our labs, including 58 engineering students and 31 rehab scientists
  + 10 of these students recognized with national /international awards

+ Published over 20 peer-reviewed publications
+ Completed more than 44 presentations at state, national, and international conferences
+ Submitted several new grant proposals and continued work on 4 other grants to extend our RERC work even further
Our vision

- Ensure that all individuals, including those with the most complex needs, have access to effective AAC to realize
  - the basic human need,
  - the basic human right, and
  - the basic human power of communication

Discussion

- How can we enhance our current research, development, training, and dissemination activities?
- What are the priorities for future
  - Research
  - Development
  - Training and dissemination?

Please visit our booth at 617!

RERC-AAC.ORG

- We are grateful to all of the individuals who use AAC and their families who have contributed to the RERC on AAC.
- The contents of this presentation were developed under a grant from the National Institute on Disability, Independent Living, and Rehabilitation Research (NIDILRR grant number #90RE5017) to the Rehabilitation Engineering Research Center on Augmentative and Alternative Communication (RERC on AAC).
- NIDILRR is a Center within the Administration for Community Living (ACL), U.S. Department of Health and Human Services (HHS). The contents of this presentation do not necessarily represent the policy of NIDILRR, ACL, HHS, and you should not assume endorsement by the Federal Government.