AACPDM Breakfast Session Handout
Complex Care meets Biomedical Engineering: a dynamic partnership that works
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Contacts:
James Plews-Ogan, M.D., M.S.
Jlp3z@virginia.edu
David Chen, M.S., M.B.A
dc9rk@eservices.virginia.edu
Christopher Lunsford, M.D.
CIs5kb@virginia.edu
Personal Cell – 704-490-6498

COLLABORATION PARTNERS (not exhaustive)
- Medical Specialties: Developmental Pediatrics, General Pediatrics, Complex Care, Physical Medicine and Rehabilitation, Orthopaedics, Neurology, Neurosurgery
- Biomedical Engineering (rehabilitation/electrical/mechanical engineering)
- Prosthetics and Orthotics
- PT, OT, SLP, Child Life
- Community Partners
- Parents
- Commercial Vendors (for donated materials and covering commercial options)

INTERPRETING MEDICAL and REHABILITATION NEEDS TO BME STUDENTS AND FACULTY
• Inclusion, Autonomy, Participation
• Functional assessments in the home or school
• Sometimes the simplest thing is the most difficult to achieve: a spoon
• Seeing the big picture: how the innovation fits into the family’s life

UNDERSTANDING BIOMEDICAL ENGINEERING RESOURCES:
- People
  o Training level
  o Skill set
    ▪ Building
    ▪ Electronics
    https://www.autodesk.com/products/inventor/overview
- Technical Capabilities
  o 3DP printers
    ▪ Software and mastery of software (related to people skills above)
    ▪ Material availabilities
GENERAL THOUGHTS
- Funding
- Patient supply and demand: referral stream, managing the numbers, focus on a setting like a clinic, a clinician or a school
- Outcomes: ICF- Body structure and function, environment, activity, participation, personal
- Evaluation: process evaluation, learning objectives, patient satisfaction, functional assessments, injury prevention, objective observer assessment in variety of settings, qualitative evaluation: tell the story

- Problem of Scale Spectrum

Mass Produced/Not Custom

VAST AREA FOR SMALL/MID LEVEL PRODUCTION

Low Production/Hyper-custom/One-offs
Table 1: It is useful to consider the resources available for a project and to assess background, level, and capability. This table is a checklist for clinical researchers assessing resources on-hand.

<table>
<thead>
<tr>
<th>PEOPLE/TECHNICAL</th>
<th>Background</th>
<th>Level</th>
<th>Capability</th>
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<tbody>
<tr>
<td></td>
<td>engineer? designer? fabricator?</td>
<td>undergrad, grad, technician, faculty/researcher</td>
<td>novice, beginner, active user, advanced research</td>
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<td>Instruments</td>
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<td>3D printers or routers?</td>
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<td>Electronic hardware (Arduino, Rasberry Pi)</td>
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<td>Hand tools (table saws, drills,</td>
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<td>Software programs</td>
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<td>Matlab CAD/CAM</td>
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<td>Materials</td>
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<td>Plastic, foam, Wood</td>
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</table>
Figure 1: Branch diagram covering the categories of resources available. The team node (or human capital) covers background and areas of expertise. The capabilities node covers knowledge, equipment, and know-how.
International Classification of Function Model (ICF)

Health Condition

(disorder or disease)

Body Functions & Structure

Activity

Participation

Contextual Factors

Environmental Factors

Personal Factors

Adapted From: Model of Disability – ICF Model