1) Name, affiliation, and contact info

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2) 2-3 broad research ideas relevant to the workshop goals

A. Interfaces, human-robot interaction, and applications for non-contact robots for **Physical Therapy** such as for stroke rehabilitation or for children with Cerebral Palsy.
B. Using robots for **teaching social-cognitive skills** to children with Autism. The challenges of study design, measuring transfer, and quantifying attention and motivation.

Example 1: Robots for Physical Therapy

A holistic approach to addressing the therapeutic and educational needs of children with disabilities has been widely accepted and embraced, as reflected in the Individual Educational Plan (IEP) employed in school systems and a multi-disciplinary intervention approach in many clinics. Furthermore, as with adults, children perform therapy when they are motivated to do so. Therapists understand this better than anyone, and therefore spend a considerable amount of their time devising means to make therapy fun in an effort to motivate the child to participate. Finally, therapists and educators must demonstrate documented progress, preferably with objective measures and via improvement in functional outcomes. Based on extensive interviews with therapists, educators, parents, and children with disabilities, and extensive surveying of technology, it is clear that few assistive technology devices, general use toys, or general educational products meet the following design requirements:

- Adaptable enough to target a wide variety of developmental, educational and clinical goals in a child-centered, holistic fashion;
- Appropriate for children as young as 3 years old;
- Include an element of fun;
- Can be modified to sustain the child's interest over a long period of time; and
- Contain embedded assessment capabilities, to objectively evaluate the child's progress.

Therapeutic robots may be able to meet the above design criteria. New research should support new (and enhance existing) therapeutic, rehabilitative and educational activities for children with neurological impairments such as cerebral palsy (CP), traumatic brain injury (TBI) or stroke.

Accordingly, there exists a continued and acute need for 1) the development and testing of methods to overcome the reciprocal social behavior impairments of ASD; 2) greater understanding of how to select interventions for individuals; and 3) packaging effective techniques with technology and/or manuals to ensure treatment fidelity (Smith et al., 2007).

Example 2: Robots for Teaching Social-Cognitive Skills

Autistic spectrum disorder (ASD) is characterized by impairments in from one to three aspects of behavior: reciprocal social interaction, communication, and restrictive repetitive behavior. Reciprocal social interaction is the core impairment in all variants and degrees of ASD and may of itself be responsible for undermining the child's cognitive, social, and communicative development. The social deficits typically persist throughout the individual's life. Basic sources of satisfaction, such as human relationships, fulfilling work, and independence are beyond the majority of individuals with ASD, including many who are otherwise characterized as 'high-functioning' with good verbal skills.

The value of autism-specific early educational intervention has long been considered incontrovertible, particularly when delivered according to a structured, data-based procedure. At the same time, there is a need for more knowledge about how to relate specific child characteristics to components of a training package. Also, despite demonstrated short-term progress, there is a lack of good evidence indicating that existing intensive, sustained, autism-specific early intervention programs can fundamentally change the life course outcome for these individuals, who remain, in most cases, severely impaired. On the other hand, there exist strong indications for intervention targeted to the early social failures of these children. It may be that more significant gains can be achieved by targeting interventions towards the fundamental social skills that the typically-developing infant solidifies in the first year of life. Early intervention geared to fundamental social processes may be able to capitalize on the high degree of plasticity of the young child's brain, and the many years of play and education available to children during which they could profit from gains in social skills.

Exploration of potential therapeutic applications of robotics with children who have autism is promising but mostly in the form of case reports or observations of child-robot contact. However, the high degree of interest children show in the interactive robot supports the use of further research into robots as adjuncts in therapeutic activities.