

Dan Odell, Ph.D., CPE

resume / portfolio / curriculum vitae

resume

WORK EXPERIENCE

Nokia, Silicon Valley, CA

Principal Researcher

February, 2012 to present

- Design and execute high-quality research with a focus on producing peer-reviewed publications.
- Evaluate new technologies and find forward-looking applications for them.
- Generate intellectual property and create prototypes that embody and validate new concepts.
- Transfer information, concepts, and designs to product teams to improve products.



Microsoft, Redmond, WA

User Experience Researcher, Hardware

October, 2004 to January, 2012

- Manage budget, timing, and contract employees in planning and implementing user research.
- Lead user research for a diverse range of products including keyboards, mice, webcams, notebook accessories, touchscreens, gesture, and NUI interactions.
- Use wide range of methods to explore and define products, scenarios, and features and to support the product design process. This includes work at the four phases of design research: inspire innovation, evaluate opportunity, inform design, and assess product.
- Generate new product concepts – with a focus on delivering breakthroughs in comfort and then extending these across the product lines.
- Leverage knowledge of human factors (physical, cognitive, emotional, cultural and social) to improve human machine interaction. Of these, my specialty is physical human factors (ergonomics) and I led the effort in improving the comfort of computing across Microsoft.



University of California, Berkeley, CA

Graduate Student Researcher, BMI

- Designed and built a new bimanual computer workstation, including hardware and software, which required expertise in ergonomics, computer science, and mechanical design.
- Created and tested the effectiveness of two-handed computer input techniques, with an emphasis on command selection.
- Evaluated system performance through a series of human-based experiments.
- Helped establish a rapid prototyping lab, including FDM, laser cutter, and injection press machines.

Icon Health and Fitness, Logan, UT

Mechanical Engineer, Treadmill

- Designed components and assemblies and laid out treadmill solid model geometry using Solidworks, AutoCAD, and I-DEAS for use in prototyping, design evaluation, and tooling creation.
- Managed drafters, technicians, and fabrication shops.
- Created, modified and updated Bills of Material and projected project costs.
- Worked with suppliers to understand manufacturing capabilities and design for the appropriate tolerances to provide quality on-time parts.

resume

EDUCATION

PROFESSIONAL CERTIFICATIONS

Education / Professional Certification

University of California, Berkeley, CA

- Ph.D. Mechanical Engineering
 - Major: Design, Manufacture
 - Minor: Business
- M.S. Mechanical Engineering



University of Utah, SLC, UT

- B. S., Mechanical Engineering



Certified Professional Ergonomist (CPE),

Board of Certification in Professional Ergonomics, USA

#1511

CERTIFIED PROFESSIONAL
ERGONOMIST



Microsoft

PRODUCTS AND PROJECTS

Nokia Research & Concepts (public only)

- Developed a taxonomy for grip styles across mobile devices and positions (sitting, standing, laying down, etc). This has implications for future device and bezel design.
- Generated the original ideas and built prototypes of alternate weighting schemes for devices that enabled:
 - devices to prop themselves up for easy viewing(no external kickstand or case needed)
 - making devices more comfortable to hold by reducing moment loads on the wrist.
- Generated the value propositions and prototyped form factors for innovative future mobile devices.
- (Unfortunately, much of my work is still considered secret by Nokia and won't be shared in detail here).

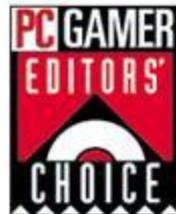
Microsoft Natural Ergonomic Keyboard 4000

- Completed work started by Hugh McLoone in improving the Natural keyboard design for the first time in the 11 years since the design was introduced.
- Ergonomic innovations of this layout included:
 - **Steeper gable “tent” slope of 14 degrees** to further minimize wrist pronation.
 - An innovative **“gull wing” QWERTY key design**: the keys on the outside columns are angled both in and up to reduce the oblique strike angle of the fingers as they strike the keys.
 - **Taller, padded palm rest** further reduces wrist extension.
- Led iterative user research for two rounds of user testing to determine user preference in design and optimize the affordances on the keyboard.
- Designed and implemented a front lift leg to provide a truly **negative slope design** of -7 degrees to minimize wrist extension.
- International patents including U. S. patent: 7,338,224
- Best selling wired keyboard over 4 years
- More than 2 million sold



AWARDS

User-Centered Product Design Award, Product Design Technical Group Human Factors & Ergonomics Society, 2007.



PC World's 100 Best Products of the Year (2006) at #54 – the only keyboard selected for the list.

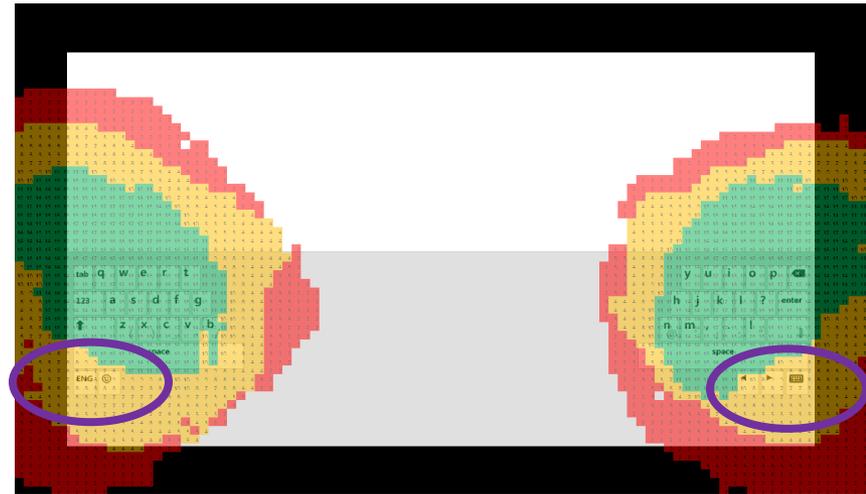
Microsoft Surface Tablets

- Co-defined keyboard layout and function (US and international)
- Provided ergonomic information to inform design of tablet and kickstand
- Ran iterative studies to improve the function and performance of the keyboard smart covers

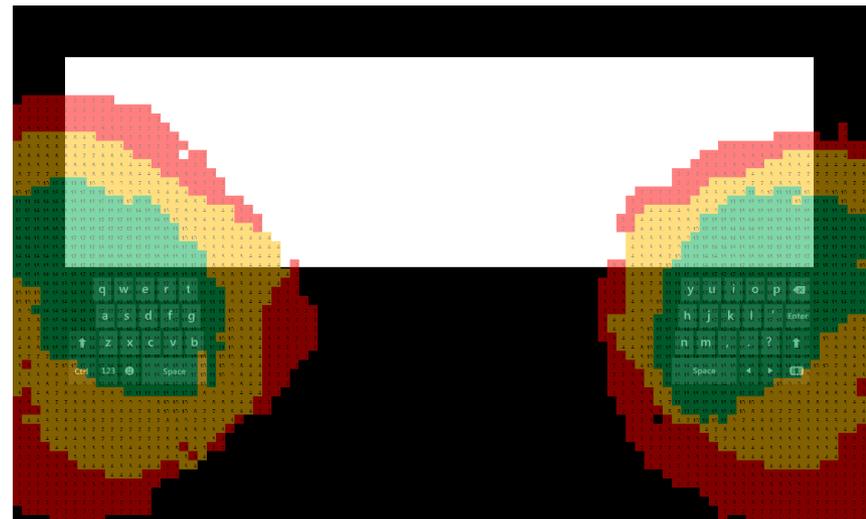


Windows 8

- Generated thumb reach heat maps to enable designers to place UI elements in areas that were easily reachable by thumb.
 - This led to a redesign of the Win8 split keyboard so that all keys were placed in the green “easy to reach” regions.
- Advised on the layout of the Win8 keyboard.



Before thumb reach considered



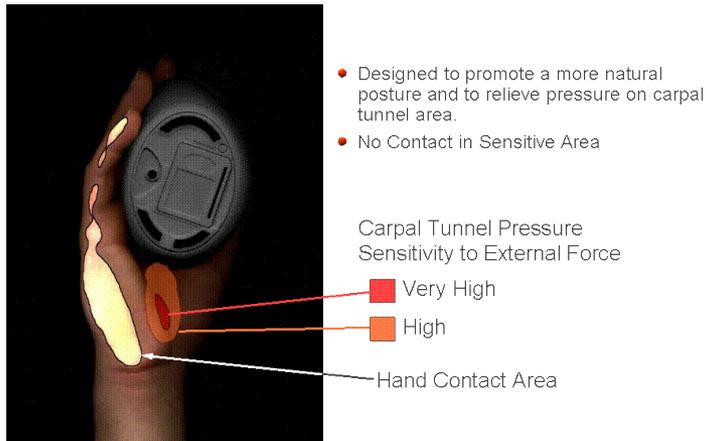
Revised design for easy reach₁₂

Natural Wireless Laser Mouse 6000

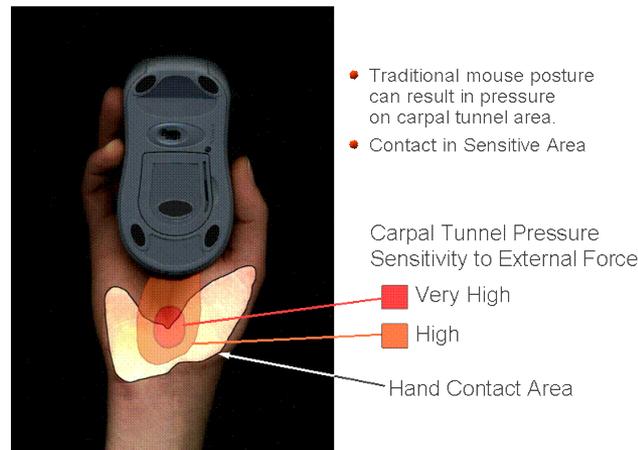
- Performed front-end research to establish user desire for an ergonomic mouse and get the product on the product roadmap.
- Defined target ergonomic postures for new Natural mouse based on objectives to reduce Carpal Tunnel Pressure, reduce tendon pulley friction, and alter contact pressure areas to move them to lower-risk areas of the hand.



Natural™ Wireless Laser Mouse 6000

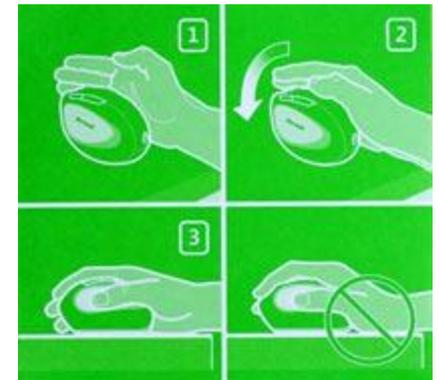


Traditional Mouse



Natural Wireless Laser Mouse 6000 (continued)

- Collaborated with Industrial Design to generate over 100 concept mice designed to deliver the target postures.
- Evaluated and refined the concept mice through 3 rounds of testing to optimize user preference, verify the desired target postures, and insure that pointing performance met or exceeded a traditional mouse.
- Executed 3 month Beta study to verify long-term comfort benefit.
- Ran study to evaluate education effects on mouse use. This affected details of the OOBE, including grip description.
- The result has been very successful and has generated frequent user reviews about “no more wrist pain,” as well as positive press.



Arc Touch Mouse



- Microsoft's first ever touch surface mouse
- Ran research to size and locate the gesture regions and define the touch interaction
- Helped to define and verify the value proposition to make the best product. This led to marketing messaging testing – refining the message to focus on the “curve for comfort, flatten to pack” message.
- Identified best mouse angle to maximize comfort and reduce retrograde scrolling
- Measured physical properties (such as weight of hand on mouse) to inform the folding tail mechanism.
- Ran benchmark and form studies to demonstrate the desirability of the mouse and identify areas for improvement.
- Led Out-of-box experience field study that identified issues and confusion that were later corrected in packaging redesign.
- Oversaw Beta test to measure experience and comfort changes over time and identify bugs in functioning units.



Gold Medal



reddot design award
product design 2011

Best of the best



Engadget 2010 “Best 15
new PC Input Device”

Wireless Entertainment Desktop 8000

- Led front-end work to uncover user behavior regarding working in low-light conditions and computing in the living room. I used this information to define the feature set and placement of affordances.
- Collaborated with Marketing to define product architecture and establish it on the product roadmap. My user research redirected the initial product definition away from a communication bundle to entertainment.
- Developed approaches to charging the Microsoft's first rechargeable keyboard and mouse. Refined and selected concepts using user feedback and task success.
- Designed and executed user studies to inform the design and insure user preference relative to benchmarks. Evaluated user perceptions of design tradeoffs – specifically size vs. number pad presence.
- Evaluated options for navigation on the keyboard. The performance data I collected led to the successful implementation of the touch area, and verified its usability.



Sidewinder x6 Keyboard

- Ran user research to understand gamer behavior with keyboards. This led to my ‘cruise control’ concept included on the x6, and the definition of the feature set.
- Executed iterative design research to refine keyboard comfort, aesthetics, numpad attachment mechanism, macro banks, backlighting color and location, and placement of macro keys.



Mobile Memory Mouse 8000

- Microsoft's first right-handed mobile mouse.
 - I was responsible for delivering excellent comfort in a portable form factor
- Microsoft's first rechargeable mouse.
 - I and an Industrial Designer developed a new USB –based recharging method using magnetic couplings.



Wide Spacebar



- My studies revealed that relaxed hand posture results in thumb resting *below* spacebar for 70% of people
- Implication - the spacebar is incorrectly positioned and users must *reach* to hit spacebar (the most frequently hit key)

- Hypothesis – wider spacebars will yield more comfort and better posture
- Testing - this simple change significantly improved wrist posture, as much as curved keysets.

Computer Ergonomics for Kids



- This is a keyboard and mouse set scaled to 140% - to demonstrate proportionally how a traditional keyboard and mouse look and feel to a 9 year old
- Generated several concepts to deliver better ergonomics for kids

Non-Microsoft

PRODUCTS AND PROJECTS

Command Chair

- Integrated input workstation designed to be more efficient and ergonomic.
- PhD thesis work – generated concept, made conceptual prototypes, and then made 3 iterative fully functional units.
- Ran simulations and modeling to predict human performance
- Ran human studies to verify ergonomic benefits: EMG for muscle loads, performance for combination pointing / typing tasks, and electrogoniometry to measure posture.

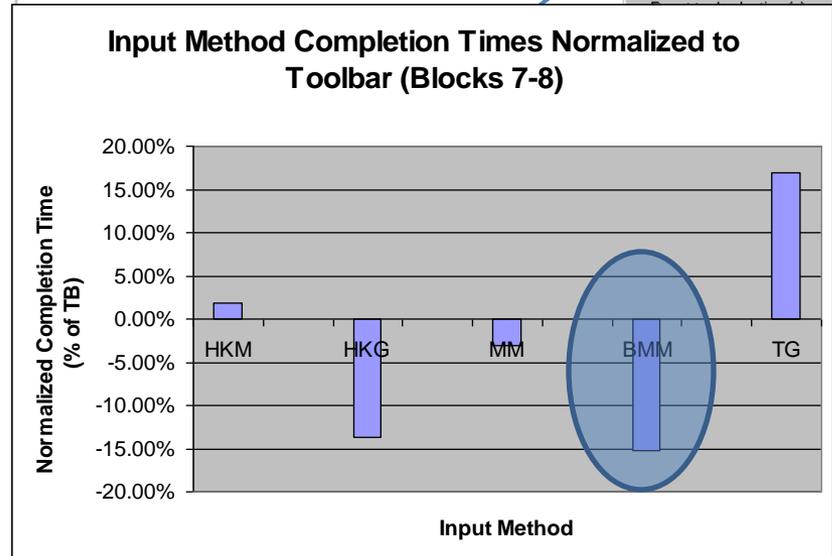
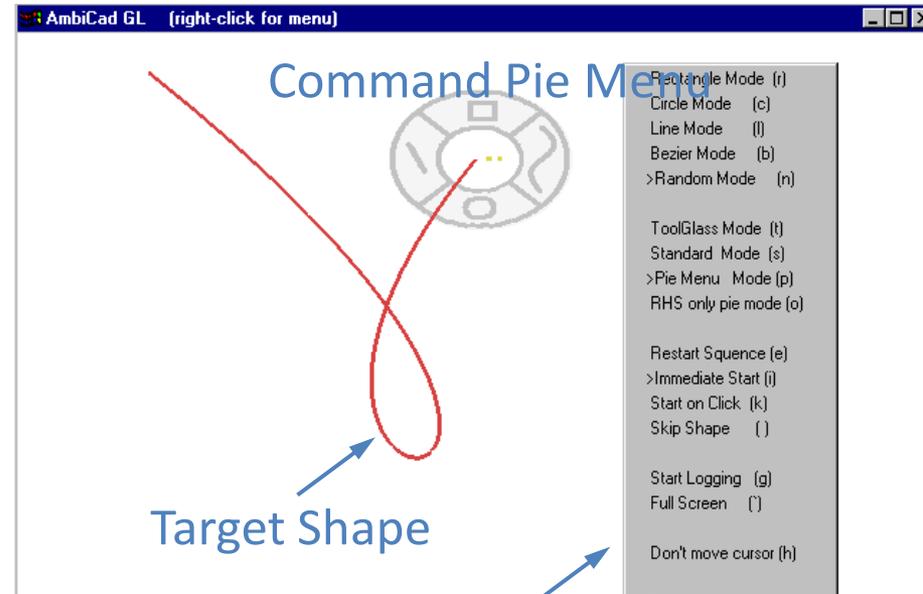


DAN!
2003



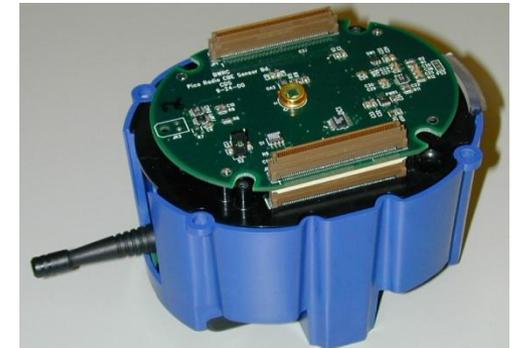
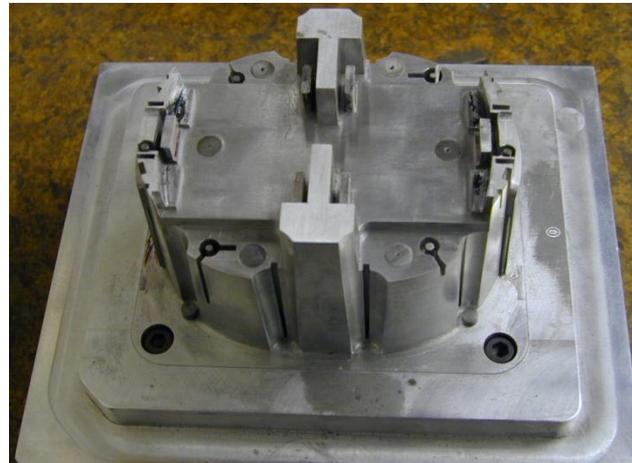
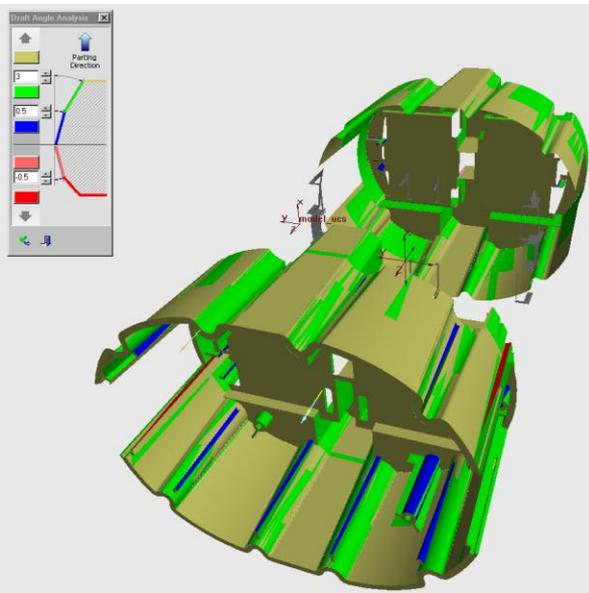
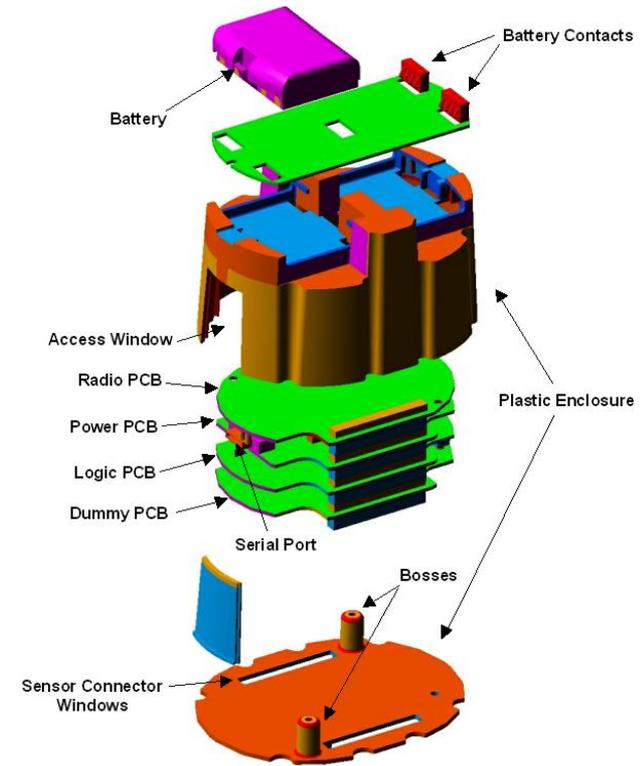
Bimanual Marking Menus (BMMs)

- Researched useful methods to make use of simultaneous two-handed computer input
- Developed a novel command selection technique (based on new object/command metaphor), called Bimanual Marking Menus
- Implemented and tested the BMM method in a drawing environment
- BMMs tested as fast as the fastest technique, with a faster learning curve and stronger user preference



Pico Node

- Collaborative ME/EE project to develop early wireless networking node.
- I designed the full assembly, designed for injection molding (including flow and undercut analysis), generated short-run casings



TriConnector

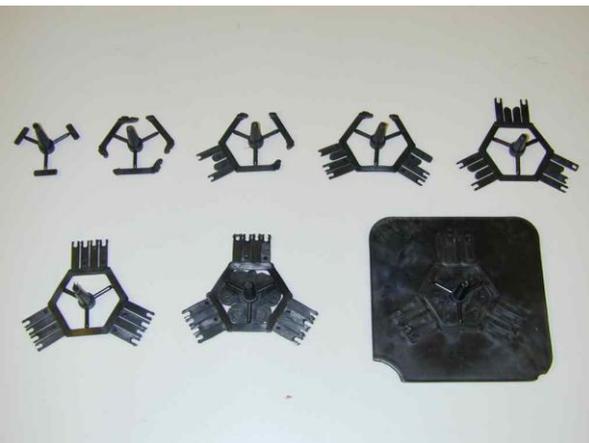
- Project with Prof. Carlo Sequin to develop 'topology legos'
- Developed concept to FDM prototypes to mold design and manufacture to short-run production
- Project became course curriculum as an introduction to injection molding



FDM prototype



Machined Aluminum mold



Dialing in molding parameters



Final triconnectors in saddle and sphere assemblies



Treadmills

- Engineered over 40 treadmills, innovating in:
 - Developed several 4-bar linkage folding mechanisms with gas springs
 - First treadmill with a book holder – based on user observations
 - First treadmill with cushioned belt
 - Patented power-adjustable deck cushioning
 - First treadmill with integrated music player
 - Improving treadmill quality and reducing costs
 - First Reebok treadmill
 - DFM



ACD4

- Power Adjustable Cushioning
- 2.5 Chp Motor



PowerTread 2000

- Adjustable Cushioning
- 2.0 Chp Motor




CD Coach

- CD Coach Technology
- Free Rhythm Mix CD



10.40

- 2-Ply Treadbelt
- Adjustable Anti-Impact System

Standalone work

CONCEPT AND HOBBY PROJECTS

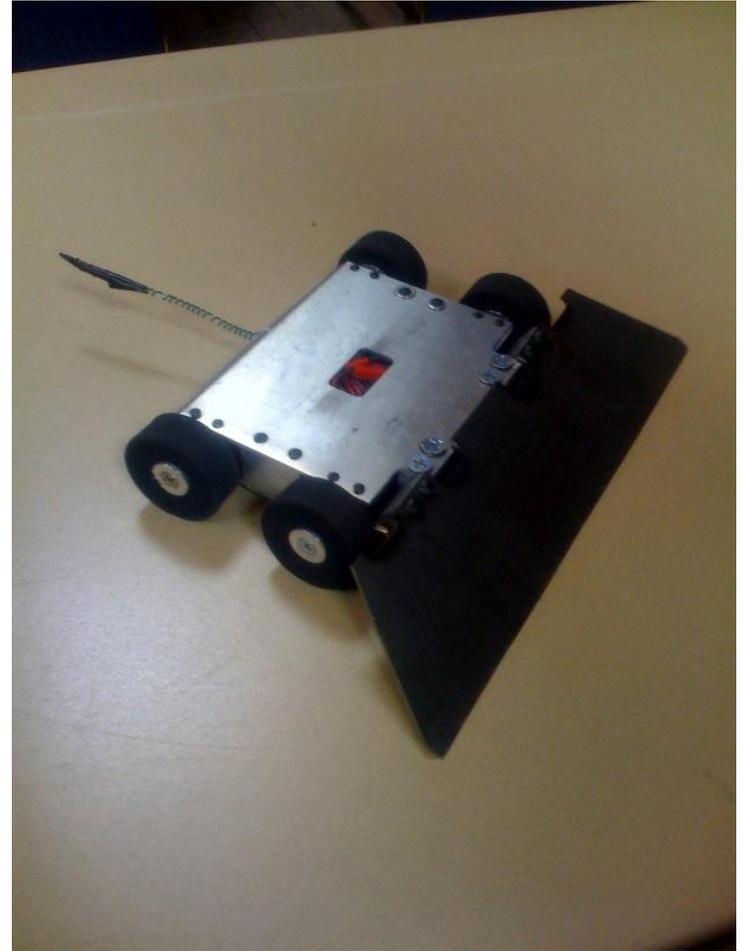
Keyboard Chaps - 2005

- *Tongue-in-cheek solution to genuine text entry problems*
- **Ergonomics** – placing the hands in the lap provides excellent typing posture and provides natural forearm support on the thighs.
- **Flexibility** – type in a variety of positions, avoid static postures.
- **Convenience** – always have a keyboard at hand.
- **Mobility** – provides a full-size input device that travels with the user into any mobile scenario (heads-up display, personal server, etc.).



Combat Robots – Team DBM

- Designed robots in CAD (solidworks)
- Generated Prints
- Researched components to identify best performers and most robust
- Sourced parts
- Manufactured components and assembled robots
- Drove robots
- Served as pit crew in robot repair
- 2/3 of my Robots rose to #1 rank in the US



Gutter Monkey

CURRICULUM VITAE

Patents

- Odell, D., Dalebout, W., United States Patent # 6,174,267, [Treadmill with adjustable cushioning members](#)
- Odell, D., Dalebout, W., United States Patent # 6,280,362, Treadmill with adjustable cushioning members
- Chatterjee; M. O'Neil; D., Odell; D. US Patent# 7,589,496, User input device charging system
- US Patent# D664964, Display screen with keyboard graphical user interface
- Other Utility patent applications pending:
 - Continuous Automatic Key Control
 - Managing Inputs from a Plurality of User Input Device Actuators
 - Reduced Impact Keyboard with Cushion Keys
 - Ergonomic Computer Mouse
 - Electrical Connection between Devices
 - Recharging system for wireless input devices
 - Ergonomic Apparatus for Keyboard
- 7 design patents + others pending

Dissertations

Odell, D., [Bimanual Computer Input and Forearm Support Implemented and Evaluated in an Integrated System](#), Doctoral Dissertation, Fall 2004

Odell, D., [Concurrent Product Design: A Case Study on the Pico Radio Test Bed](#), Master's Thesis 2001

Publications (2009 – present)

- Odell, D., Chandrasekaran, V., (2012) Enabling comfortable thumb interaction in tablet computers: a Windows 8 case study, HFES 2012
- Pereira, A., Lee, D., Sadeeshkumar, H., Laroche, C., Odell, D., Rempel, D. (2012) The effect of keyboard key spacing on productivity, usability, and biomechanics in touch typists with large hands, HFES 2012
- Camilleri, M., Odell, D., Chu, B., Ramesh, A., Rempel, D. (2012), Indirect touch pointing with desktop computing: Effects of trackpad size and input mapping on performance, posture, discomfort, and preference, HFES 2012
- Young, J., Trudeau, M., Odell, D., Marinelli, K., Dennerlein, J. (2012) [Touch-screen tablet user configurations and case-support tilt affect head and neck flexion angles](#), Work, 41 (1), pp.81-91
- Asundi, K., Odell, D., Luce, A., Dennerlein, J (2012) [Changes in posture through the use of simple inclines with notebook computers placed on a standard desk](#), Applied Ergonomics, 2012 Mar, 42(2), pp. 400-7
- Asundi, K., Odell, D. (2011) [Effects of keyboard keyswitch design: A review of the current literature](#), Work 39 (2), pp: 151-159
- Odell, D., Lee, D (2010) [Redesigning the keyboard spacebar can improve wrist posture while typing](#), PREMUS 2010
- Asundi, K., Odell, D., Luce, A., Dennerlein, J (2010) [Notebook computer use on a desk, lap and lap support: effects on posture, performance, and comfort](#), Ergonomics, Volume 53, Issue 1 January 2010 , pages 74-82
- Asundi, K., Odell, D., Dennerlein, J., The effect of inclines on upper extremity postures during notebook computer use, IEA 2009
- Asundi, K., Odell, D., Dennerlein, J., Upper extremity postures during notebook computer use in common portable computing scenarios, IEA 2009
- Houwink A, Oude Hengel KM, Odell D, Dennerlein JT. (2009) [Providing ergonomic instructions enhances the biomechanical improvements of an alternative computer mouse design](#). Human Factors, 51(1): 46 -55.
- Rempel D, Nathan-Roberts D, Chen BY, Odell D. (2009) [The effects of split keyboard geometry on upper body postures.](#), Ergonomics, Volume 52, Issue 1 January 2009 , pages 104 - 111
- Kimmerly, L., Odell, D. (2009) [Children and computer use in the home: Workstations, behaviors, and parental attitudes](#), Work: A Journal of Prevention, Assessment and Rehabilitation, Vol 32, Number 3, pages 299-310

Publications (2001 – 2008)

- Oude Hengel, K., Houwink, A., Odell, D., Dieen, J., Dennerlein, J (2008), [Smaller external notebook mice have different effects on posture and muscle activity](#), Clinical Biomechanics 23 (2008) 727-734
- [Maximize your comfort with the Natural Wireless Laser Mouse 6000](#), Microsoft Web Article 2007
- Odell, D., Johnson, P. (2007), [Evaluation of a Mouse Designed to Improve Posture and Comfort](#), WWCS 2007, 115
- Dan Odell; Alan Barr; Robert Goldberg; Jeffrey Chung; David Rempel, 2007 [Evaluation of a dynamic arm support for seated and standing tasks: a laboratory study of electromyography and subjective feedback](#), Ergonomics, Vol. 50, #4, pp. 520-535
- [The Importance of Ergonomic Input Devices in the Workplace \(The Scope of Computer-Related Repetitive Strain Injuries and Methods for Their Prevention\)](#), Microsoft white paper, 2005
- Odell, D., Davis, R., Smith, A., Wright, P. K., [Toolglasses, Marking Menus, and Hotkeys: A Comparison of One and Two-Handed Command Selection Techniques](#), Graphics Interface, 2004, May 17-29, pp. 17-24
- Odell, D., Wright, P. K., [An Integrated Bimanual Computer Input Station: the Command Chair](#), BMI white paper, 2003
- Odell, D., Wright, P. K., [Concurrent Product Design: A Case Study on the Pico Radio Test Bed](#), Revised for ASME's 2002 Design and Engineering Technical Conference (DETC), DFM #34154
- Ahn, S. H., Montero, M., Odell, D., Roundy, S., and Wright, P. K., 2002, [Anisotropic Material Properties of Fused Deposition Modeling \(FDM\) ABS](#), Rapid Prototyping Journal, Vol. 8, Number 4, pp. 248-257 - Winner of the 2003 Literati Club Highly Commended Paper Award
- Montero, M. G., Roundy, S., Odell, D., Ahn, S., Wright, P. K., [Material Characterization of Fused Deposition Modeling \(FDM\) ABS by Designed Experiments](#) Proceedings of Rapid Prototyping and Manufacturing Conference, SME, 2001.

Press Articles referencing Dan

- **Elementary Ergonomics**, T.H.E Journal ,06/01/09 – Jennifer Grayson
- ***Setting up your computer environment the right way can help prevent repetitive stress injuries and other pains.*** by Marc Saltzman
10/4/2007
- SharkyExtreme.com: Interview with [Microsoft's](#) Dan Odell By [Vangie Beal](#) : April 17, 2007
- **Save Your Back and Wrists: Top Ergonomic Tips**, Inc. Magazine - 9/2006, By Marc Saltzman
- **Ergonomist Provides Tips for Creating an Ergonomic Workspace**
May 17, 2006 -- *Jennifer Anderson*
- **A Gull's Wing for Flying Fingers**, New York Times
9/08/2005 By Andrew Zipern