

ADAPTIVE SIT SKI & SEATING INNOVATION

Kevin Priebe

ERNEST C. MANNING INNOVATION AWARDS

2014 APPLICATION



On The
Snow-



On The
Water

Maple Ridge BC • telephone: AdaptiveSeatingProducts.-
com



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Biography

For the Past 3 Years I have become a full time Athlete Competing at a National Level.... Training twice a day on the water; in the gym and on the snow in the winter.

Leo Award - Artist 2006, Nominee 2008. BCIT - Engineering Design/ Welding. Blanche Macdonald Centre Diploma. AI Burnaby - Video Editing and Photoshop.

World Traveler - Europe 1992; Africa 2004; Mexico, USA & Canada

Volunteer

Currently Chair - Municipal Advisory Committee on Accessibility Issues (City of Pitt Meadows & the District Of Maple Ridge) - Duties include - running of meetings; conflict resolution regarding accessibility issues. reports and presentations to council and other bodies. Research, assessments and recommendations. Community support i.e. : housing/ employment/ sidewalks and curb cuts, community events and awards.

Rick Hansen Foundation Ambassador... helping to organize events; consultant and presentations (Schools, Work BC....) personal account of my experiences and awareness.

GF Strong- Rehabilitation Volunteer (duties included Peer Support/ Fitness & Social Outings)

Education

2013 ~ BCIT Engineering Design- AICO

2007 ~ Prop Weapons and Advanced Anatomy: Healy FX Studios Inc.

2004 ~ BCIT Welding 0102/GTAW 0110/Aluminum 0115 (90 Hours)

2002 ~ AI Burnaby Photo Shop/Final Cut

2002 ~ Shadbolt Centre of the Arts Sculpture

2001 ~ **2002** Makeup Artistry/Air Brushing/FX: Blanche Macdonald Centre

2000 ~ Nail Technician #1035879: Cosmetologists' Assn. of BC

Prior Education~ Philosophy- Criminology 1st year - Fitness Certification

Awards & Achievements

2013 ~ Cross Country Nationals - Silver 800m Sprint

2011 ~ **2013** Canoe Kayak Canada Can Am 200m Lake Placid

2011 ~ Swim Canada Can Am 50m Gold Quebec

2008 Leo Nominee "The Collinwood Campaign" Best Makeup in a Short (leoawards.com)

2006 Leo Winner "Remembrance- a Soldier's Story" Best Makeup in a Short Drama

Art Exhibitions

2010 ~ Sport Re-imagined ~ City of Port Coquitlam ~ Leigh Square Community Arts Village

2009 & 2010 Color Wheels ~ Blusson Spinal Cord Centre RHWM

2009 ~ The Red Dot Affair ~ Maple Ridge Art Gallery

2009 ~ World Rose Festival ~ Vancouver Trade & Convention Centre

Film & TV Credits

2011 ~ Everything And Everyone - Director Tracey D.Smith ~ 6 days Makeup SPFX
2009 ~ Nick Troop Productions - Makeup SFX & Prosthetics
2009 ~ "Fragile": Director - Eric Maran ~ 5 days Key Makeup SPFX
July/07 ~ "Edison & Leo": Key - Justin Ewart ~ 4 days as Puppet Painter
July/07 ~ "The Collinwood Campaign": Director - Ryan Mains ~ 2 Days Key Makeup
Feb/07 ~ "Grand Opening": PM - James Perry; Key ~ 5 Days First Asst. Makeup FX
Aug/06 ~ "Ashes Fall": Director - Eric Maran; Producer - Rob Fernuk; 2007 AFI Dallas International Film Festival (ashesfallfilm.com) ~ 3 Days First Asst. Makeup FX
Jan/03 ~ "Notes From the Space Time Continuum": Director- Kevin Haverty ~ Audience International Choice Award - Chicago International Film Festival; Winner Golden reel Award Best Experimental Film -Tiburon International Film Festival; Official Selection Best of the North West Film Festival (crimsonfilm.com) ~ 10 Days SPFX Prosthetics
Nov/ 02 ~ "Remembrance; A Soldier's Story": Producer, Key Makeup/FX and Prop Builder
Sept 02 ~ "Urban Rush2": Shaw
Jun/ 02 ~ "Canadian Zombie": Director- Julian Clark ~ 3 Days Makeup

Photo Shoots

2009 ~ Chris Griffin - Bronze Statue
2009 ~ Eric Milner – “Bit” VPD Morgue
2009 ~ Colin Mills - “Grow the Fuck Up” VPD Morgue
2007 ~ Joshua Hines - coy tattoo

Union

IATSE 891 - Permittee Makeup & SPFX Makeup
ACFC West - Permittee L1 1st Assistant Makeup and SPFX Makeup

Safety

2003 ~ Standard First Aid Level C: Trauma Tech
2001 ~ WHMIS #282636: BC Institute of Film Professionals - Ty Haller

Professional Development

2012 ~ District Of Maple Ridge ~ Running Civic Meeting Workshop
2009 ~ Blanche MacDonald Centre – Makeup Masters
2006- 2008 ~ International Makeup Trade Show LA & BC- Advanced Workshops

Seating & Ski Innovation Summary

Shortly after a motor cycle accident in 1993 I started the road to recovery. In the years since I have purchased a total of 5 manual wheelchairs and 3 electric chairs. I was just never quite able to get the support out of the equipment that I required with the products that are available on the market. I started to think of a wheelchair like a prosthetic limb; our seating as the socket that connects us to the activities we are trying to accomplish. After working with a local Occupational Therapist and talking to several

prosthetic manufacturers I had a body support made. I finally was able to get a physical connection. Though when it came to modifying the design to work with a wheelchair I was left to fend for myself.



Because this idea/ concept is really uncharted, most builders just don't realize the positive impact such a simple idea can have on someones life. Having tried sports activities since my accident it wasn't until recently that I was able to take the next step.... I was always fighting so hard just to stay upright in my chair without falling; being an athlete just never entered my vocabulary.

I started by building my own wheelchair backs when I realized that there was more people out there than just myself dealing with many of the same issues. Believe me its such an overwhelming ordeal trying to get back on your feet. It has been 10 years plus building/ modifying... talk-

Sit Ski Built With Recycled Hockey Sticks/ Ultra Light Weight Carbon Ski

ing to other professionals in related fields... Listening to the needs of others like myself that has gotten me to where I am now.

The latest step has been the reuse of broken hockey sticks to replace Aluminum. Having worked with Carbon Fibre for some time I've realized its many benefits. Weight/ Strength/ Flexibility both in Concept of Design and Torsional Strength as well as Impact Resistance. While the Cost of materials can be more expensive - by reusing such a high quality product has helped evolve the equipment I'm building for myself and now able to build for others.



1993 Shortly After my Accident



Daily Wheelchair Custom Fitted Back Top View



Cross Country Canada Para Nordic Camp Nov 2012
Canmore Ab. Biathlon Training

Description of Innovation

Level the Playing Field

Goal to give Every Athlete the opportunity to Live Life.

Being a High Level Athlete I have realized there's a serious Lack of Equipment and Providers that are able to build, have the time/ ability to work with demanding Athletes like myself.

2 Steps Forward & One Backwards

While not every idea works there is a clear evolution of the equipment thats being built.



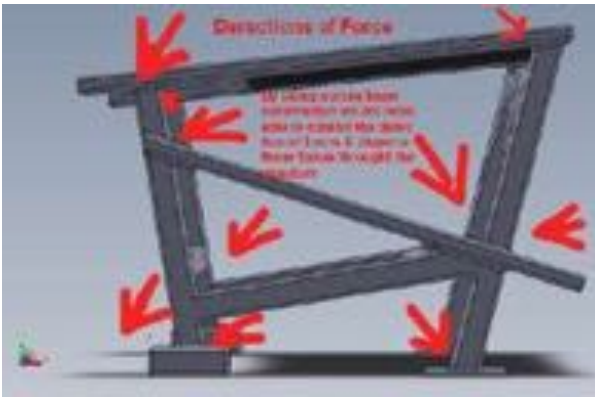
3D Model Sit Ski



Mock Up



Finished Sit SKi



Design and Consult

- Assess the athletes needs and goals.
- Using Computer aided design... I am able to share my design concepts with clients. We can compare current designs being used by other athletes... Work with coaches and other support staff.
- What other components are needed. i.e Strapping, Slings and Padding. Is a support bucket required. Often athletes loose the ability to transfer power in an efficient manner, because of the lack of connectivity between the body and the equipment.



Seat/ Bucket Mould

- Not every athlete needs a High Back Bucket.... Many athletes are amputees... Others suffer Muscle/ Skeletal or Degenerative Diseases....
- Its at this stage where we address issues/ concern like kyphosis and scoliosis. By Correcting imbalance in the body/ by equalizing the mold we can address and help reduce future injury/ decrease pain/ add pressure relief zones... Help them Maximize there Potential.



Materials and Layup

A key part of the success of the seating System has been the use of Carbon Fibre and sub materials (Epoxy Resin, Foam Core, Soric, Kevlar)

- Light Weight
- Strength
- Impact Resistance
- Build Design Flexibility
- Flexion and Rigidity. By laying directional or weaved material in certain directions as well as changing the layup of layers; the properties of finished seat can be influenced.

- Vacuum Injection. Minimizes Epoxy used/ reduces air entrapment and maximizes infusion quality.
- Yielding a superior end product.





Hockey Sticks

Taking this concept one step Further... by Reusing Broken Hockey Sticks. I am able to build a superior Light Weight Cost Efficient Ski Frame; Allows for Flexible Design options, superior strength properties. Not to Mention I just go to the Local Ice Hockey Rink and there is always 1 or 2 in the garbage cans. Dramatically reducing the overall build cost. Budgeting is a key part of the process when working with people with disabilities.

The Frame is constructed using mortise and tenon joints epoxied together with a carbon paste. By Building Ski Frames I am proving the value of the reuse concept. The next step will be to expand its use by building a variety of equipment.

Padding and Cushioning

- Medical Grade Foams- Heat Formable
- Light Weight/ Mold and Moisture Resistant/ Thermal Regulatory Properties.
- Neoprene Skins are also used for their abrasion Resistant Properties. To reduce the affects of sheering... of under-lined Muscles, Bones and Skin causing serious injury.

Fitting

The final step in the process is the fitment.

- As our clients are not first time users/ this process has been made easier since I rely on feedback and input from the Athlete.
- During this Stage I ask the user to use the equipment periodical/ checking for abrasions: pressure or irritated areas. As Modifications may be needed/ it may take time to become custom to modifications... as many injuries can lead to an imbalanced... doe to medical conditions and or by having improper posture over time.



Usage Options Benefits

This same Ultra Light seat is also being used in my Kayak. Having equipment that can be used on a cross platform is unheard of in Para Sports.

- Reducing Costs over all costs
- increasing multi sport usage/ cross training
- Increasing up time by helping to reduce the learning curve.
- Increased my sitting time, reduced the recurrence of pressure sores through the distribution of pressure
- Improved performance and Safety. By providing a protective armor against impact dramatically reducing possible injuries. (As our bodies become inactive over time bone density can be reduced because of a lack of weight bearing activities. This can lead to life changing injuries such as Hip Fractures that can be dramatically reduced through proper equipment fitment.
- Improved Stability. Through a direct correlation of proper fitment of equipment stability is also improved.
- Controlled Seat Flexion - I am able to install properties into the equipment that assist the user to transfer their mechanical energy through the equipment maximizing effort.



Sit Ski Dec 2012

Second Generation Frame Design Using Recycled Hockey Sticks & Adaptive Carbon Seat.

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Development of Innovation

Being a T1 Asia A Para I am also the highest level injury athlete competing in both Sprint Kayak and Cross Country competing at the National Level (no Trunk Control)... yet I am proving through proper design that competing at a high level is achievable.



2002- Mold Positive, Wrapping and Heat Treating Cushion, finished Seat.
The Initial Concept and Implementation of building a back support for my wheelchair had just started prior to the bottom 3 photos. These are photos of my First attempts at Negotiating Dimension Constraints of both athlete and boat. These seats were first used in a 6 person Outrigger Para group; Pogue Sports Vancouver BC. Then several years later we started paddling K1 Sprint Kayak; Pitt Meadows Canoe Kayak Club for Canoe Kayak BC. The 2 top pictures were taken at Canadian Sprint National in Regina Sk.



Fiber Glass Mould



Heat Formed Foam Liner



First Adaptive Seats For Kayak



Kayak Build

This is the First Kayak I built was with the help of Steve Schleicher at Nimbus Kayaks. He had built a kayak for Rick Hansen some time ago and was intrigued with the idea of working with me on another project. As well he just wanted to see me out paddling. He allowed me to come into his shop and build a boat. Steve worked with me to insert a high seat back into a sit on top kayak as well as build this hybrid kayak. While the kayak worked well there were some functional concerns:

- The cockpit water line was too low.
- I would have preferred a single foot well similar to the epic kayak below; my feet tended to bind when flipping.
- no Ventura to let water out of foot well.
- As well the cockpit itself was to large and water would accumulate.



Deep Cove 8Km open water race



Later I moved on to this highbred Surf Ski design with Ulna (2 pictures on Right). Overall it offers a significant improvement in design. Boat characteristics: Lighter more streamlined boat design. The cock pit is much more ergo dynamic and is better suited to paddling in open water. Provides a good cost to adaptation relation. Having paddled this boat many times in the open ocean; it is relatively easy to exit and re-enter safely.

Added back similar to the one used on my wheelchair.



Nelos para seat while it is great that a manufacturer would incorporate the needs of para sport; the seat itself is poorly designed. There is a large ridge that runs down the centre of the seat under the coccyx and it is extremely small with a square back. I have seen fellow athletes receive severer injuries from its use. The main concern regarding injury is the lack of sensation and the severity of potential injuries once detected



Adaptive Seating High Back Race Seat Viper 55



Nelo Para K1 Race Seat Viper 55



Standard Seat Viper 55



To the Left is the seat above being used on the water. I am also using a support strap around my Trunk with no pontoons or stabilizers. It has taken a lot of hard work; dedication, product development, understanding of my own personal limitations and know how to help me push these boundaries to reach this point.



Down Hill Sit Ski

This same Seat was Retrofitted for use on a Mono Board that is still in the testing stages. Loading on the ski lift and moving backward on flat snow is very easy as it is extremely stable.... Though the ski frame design itself is in need of some modification. Lower seat height and move the center of gravity to the rear three inches. The main stalling point on this project is lack of assistance/ cost of testing/ and time available. I will revisit this project in the near future as I believe it has merit.

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BMX

These pictures are of the same seat being used on an electric BMX Quad that was developed by Wade Lander. We put this project to the test at both the BMX Park and Mountain Bike Park. This Collaborative Cooperative use of both our pieces of our equipment. I believe was very successful. The test runs pushed all our equipment to the limit and helped show us where our designs could use improvement.

Project Potential - Increased market awareness as this is an interesting concept with multiple opportunities: creating a greater awareness and accessibility options.

In Conclusion - we have not moved forward with the BMX project.



3D Imaging

After thinking for some time of the Best Way to move forward... I started pursuing 3D modeling. First with Auto Cad then Moved on to Solid works as its 3D modeling part break down and construction lends itself to the better development and sharing of information. As well it is easier to communicate the desired final result/ change and modify the desired design, obtain purchase contracts and work health specialists.

Vorum CNC Machining and 3D Imaging

While the use of a CNC Machine and Prosthetic Imaging Software is tried and true due to the direction I intend going moving forward. I believe the cost of the equipment cannot be justified. It was a difficult decision not to move forward as the Tech Supplier Vorum did offer us a pay per use contract, use of the CNC machine saved us time and energy. Though I believe that at this time without a separate funding source there wasn't enough paid work to demand the cost of this equipment. I've since focused on product development/ testing and racing.

With the development of 3D printers I believe in the near future we will move forward using this type of equipment. Smaller more affordable and look at purchasing a CNC Router that more better suited to a low production/ High Quality Shop.

Moving forward it is important to remain cost effective finding and using the latest technology available.

Adaptive Seating Products

info@AdaptiveSeatingProducts.com



Our goal at Adaptive Seating Products is to offer you Innovative Seating Solutions for greater health!

We provide you with a handcrafted, quality product that is fitted to YOUR body and ensures improved circulation that in turn offers you better quality of life. Whether you are disabled or able bodied.. this product is for YOU !

Adaptive Seating Products is a British Columbia based business that has been founded from a need for better quality, comfortable and more affordable seating.

Kevin Priebe and James Telep has been wheelchair bound for 18 and 14 years.

Both Kevin and James are trained athletes who have competed nationally and are currently training to compete at the Paralympics in 2016. They have suffered from pressure sores, cuts, bruising and poor circulation due to seating that was not designed specifically for their bodies resulting in pain, frustration and months of lost wages.

Using state of the art 3D scanners enables us to get precise measurements required to make this customized seating. Using our seating design software we customize the seat for the application. We then use the P&O 6-Axis carver to create the seating mold. Finally we create your seat by hand and will then perform your custom installation of your new seating product into any application you require.



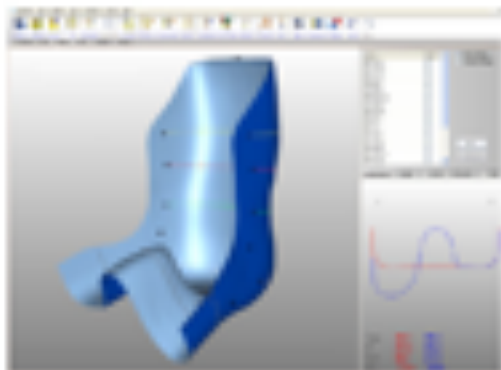
Custom fit applications





ACCESS... design without limits

3D Scanning



Seating Design software & In-lab Carver



Co-Builders :
Kevin Priebe
James Telep



- we use 3D Scanning which enables us to get precise measurements of your body ensuring a perfect fit for you
- we use Seating Design Software
- we use only the highest grade medical materials
- we work with your physiotherapist to ensure our products are created with your specific health issues and medical needs in mind
- once your mold has been designed, we can recreate additional seats quickly and at a fraction of the cost to you

Let us help you...with FlexFormseating

Our uses can range from wheelchairs to sporting equipment to heavy machinery seating applications. With our process we can solve the well documented issues of pain management through proper postured seating and backing. Our finished product will allow our customers to sit and be comfortable while sitting in their wheelchairs or custom seating for longer durations of time

Product updates can be found at
AdaptiveSeatingProducts.com
info@AdaptiveSeatingProducts.com

Reclaim your life today with better health through
Flex Form Seating

AdaptiveSeatingProducts.com
Kevin Priebe 776-899-5739
James Telep 604-789-5342





Seat Construction

CNC Milled Foam Plug

The CNC Milled Plug after Hand Finishing it myself. Prepped for a Fiberglass & Gell Coat Top Layer to reinforce the skin.

Prepping and Top Coat

Here the mould is being balanced and a feathering putty. After a layer of fiberglass cloth has been laid down. It will later be Gell Coated and polished to a high gloss finish. This process takes time and practice; as putting on to much filler can lead to imbalance and lots of sanding. It takes Skill, Practice, Patience and Time Management.



Finished Mould

Here we have a finished Negative Clear Coated and polished with a mould release. There are several ways we can approach the next step; The Adaptive Seat Layup.



1. One piece or multi piece (adjustable Seat Angle)
2. The Rigidity/ How much Flex (Where is the Level of Injury? How much Muscle Control does the user have, do they want the seat hip joint to have Flexion or be ridged?)
3. Do we want the unit collapsible able.

These are all considerations that are addressed moving forward.



Seat Construction

Finally the layup. It important to understand the forces that are being applied and the desired goal of the finished product. The laying and use of materials has a profound effect on the finished characteristics of the product.





Completed Chair With Adaptive Seat

A Roho seat cushion is used in conjunction with the seat.



Cross Country Sit Ski

I was introduced to sit skiing Winter 2011. This is a pic of me skiing using a ski provided by the Nordic Racers. Since the back of the ski was much too low for me and the ski didn't fit right I was able to strap my seat to the ski and go out and have some fun.

Ski Design

With this new project on the horizon I started drawing concepts in solid works.... Incorporating the use of recycled hockey sticks to replace Aluminum (which unless heat treated loses much of its strength when welded and is a special ordered product).

Construction

Having used the green frame in the back of the bottom photo for the spring of 2012 I had a much better idea what it is that I was looking for in equipment. During the final days of spring training camp 2012 the welds on the green ski broke tearing the aluminum tubing.

New Seat- started by first creating a new seat. Having discovered the need to control counter rotation in kayaking... focus on driving all energy forward. The leg length of the seat was increased to encompass the knee joint and well narrowed to restrict unwanted movement.

In the bottom pic we see the seat and frame mock up.





BC Para Nordic Mens Overall Winner

This was quite the year... Learning how to ski... Climbing the local mountain Cypress. With the goal of just being able to finish the National Race Course at Whistler 2013.

[Paranordic competitor aiming high - Maple Ridge News](#)



Dry Land Training

On the left is a picture of my Cross Country Sit Ski using a wheeled set up I build to help me train prior to the Canadian Nations at Whistlers Olympic Park Spring 2013. After making modifications to this first frame I was ready for a second generation.... with a focus on making the ski lighter incorporating all the modification with a single goal; improve my ability to climb the hill at the Para Nordic ski course at Nationals.

2nd Generation Ski Frame

Using the same seat bucket... this time I decided to showcase the hockey stick frame.

Below is a picture from 2013 Cross Country Canada Nationals. I am number 10 on the starting line. In the 800m sprint I received a bronze medal.



Kneeler Sling Ski Ski for Stacie Louttit

Since Stacie is able to walk (she has a low level injury). The primary goal of the ski was to focus all her strength on driving the ski forward; while maintaining control. We Wanted to have her knees slightly lower than her hips to encourage a positive weight bearing rotation of the body. To achieve this here legs needed to be able to go underneath her... at the same time she has hypersensitivity and no sensation in her feet.

- The ski needed to be easy to get in to.
- Light, strong, provide impact resistance and be comfortable.
- Give her the opportunity to preform good technique.
- Be close enough to the ground to allow her to stop and easily recover from a fall.



Reference material from Kinematics and Kinetics of Ski Technique and pic from [Ski Biomechanics](#).

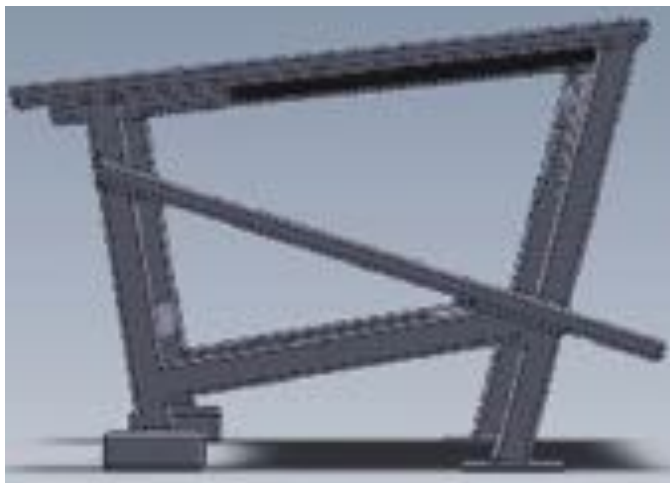


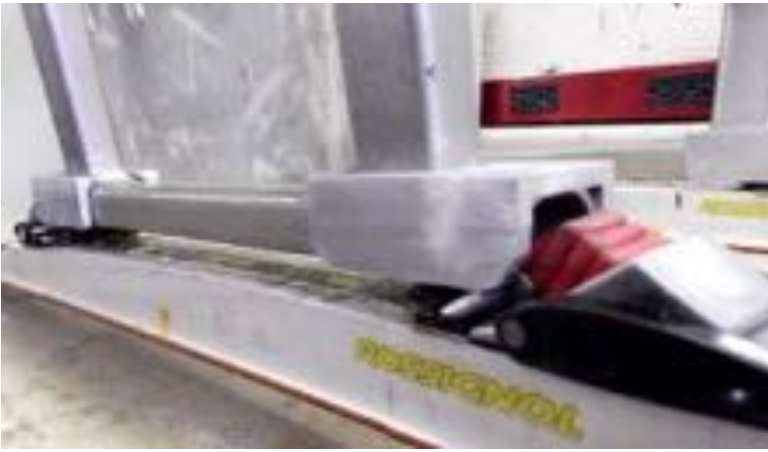
Design

Collaboratively we started on a design. With Stacie's input I was able to come up with a sound concept.

Build

We started by doing building a mould box that replicated the the desired hight and seating angles. Then back filled it with an expandable rigid foam. Marked and measured required dimensions. Built a negative plug from the imprint; then did build a seat to best reflect her needs.





Double Binding System

Since this is the system used by most sit skiers we decided it would be best since Stacie skies with a different club. In the top left picture I am marking the aluminum mounts for the binding **Locking Pin** Marking and installing lock pins so the binding system works with minimal effort.

Fitting

Ensure easy exit and entry. Build all strapping and additional padding as required.

After Stacy tries skiing a few times this winter we'll do a second video assessment on the snow and make modifications as required.



The Successful Commercialization and Marketing Results of the Innovation

- Knee Braces [REDACTED] Ski Diving. Matt Thola
- Sit Ski [REDACTED] including Labour and Materials Stacy Louttit
- Manufactured in shop located [REDACTED]
- Distributed Locally.
- Social Success is both National and International.
- Presentations and information sessions.

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Social Success

The success of this innovation may not be measurable in dollars, but more likely in terms of impact, broad acceptance and recognition which is documented in these pictures. I have the opportunities to interact with people locally and from around the world. Do presentations at ICORD, GF Strong, ConnecTra and at schools. Sharing my pictures, projects, ideas and accomplishments. Assist others in achieving their goals.

Deep Cove BC.



Rick Hansen 25 year Relay Maple Ridge



Team Canada Canoe Kayak Can Ams Lake Placid

Cross Country Nationals BC Para Nordic Whistler



Glenwood Elementary Maple Ridge School Presentations



Kamanu Composites Hawaii

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The Nature of the Resources used in Conceiving, Developing and Applying or Marketing the Innovation

- Capital of funding for the development of the innovation came from personal savings.
- My Parents have provided the use of shop and facilities.
- James Telep has shared the cost of some shop equipment [REDACTED]
- Vorum provided a sample mould/ 3D Image Scanning and Computer Demo of their Prosthetics and Orthotics Canfit System. Michelle Wymer, Jeffery Chang

Involvement of other Individuals in Conceiving, Development and Applying or Marketing the Innovation.

Lauren McCleery - Career Facilitator / Job Developer Neil Squire Foundation

- [REDACTED]
- I've Had many meeting with Lauren regarding keeping on track.... having a business goals plan. She also referred me to other professionals in related fields for advice.

Dr. Jaimie Borisoff. Focuses his research on how technology development can ... Dr. Borisoff helped develop the Elevation **Wheelchair**.

- We talked about trade marks and patents, the cost and difficulty associated with obtaining intellectual rights.
- We also talked about market focus. Who are the clients? where do we start.

Ken Knechtel [REDACTED]

- My neighbor often comes over and we talk about projects. He helps me reflect/ look at the bigger picture.

My Parents - Marlin and Marg Priebe- they are always there if I need a hand.

James Telep

- James is my business partner at adaptive seating products. We worked together to build his seat and also other projects.
- James and I also did several presentation together.
- James also supplied me with a majority of the Hockey Sticks.

Steve Schleicher Nimbus Kayaks

Other note able people

My coaches Tony Chin Nordic Racers/ Peter Majewski Ridge Canoe Kayak Club; Emma Buttons, Deborah Page, Jeff Van Horne, Christine Bain and fellow Athletes Tony Flores, Suleiman Muse, Vadim Kin.... Friends Shannon Gibney (Vancouver Coastal Health Authority.... helped get me out of the hospital and house and on to skiing, kayaking).

Thank you all for sharing your ideas... giving me input.... allowing me to look at your equipment designs. Helping me become a more successful athlete.

Endorsements from Individuals Qualified to Comment on the Success of the Innovation

To whom it may concern:

My name is Vadim Kin, and I am a fellow adaptive athlete - three times member of the US National canoe/kayak team, and an adaptive Nordic skier. I have know Kevin Priebe and enjoyed competing against him for over two years.

It is my pleasure to complement Kevin on his invention, design and production of a Nordic sit ski frame. There are a number of frames currently on the market, but Kevin's is the only one made of stiff and lightweight carbon fiber tubing, which is stronger and lighter than aluminum that is commonly used for this purpose. And what's truly ingenious is that Kevin is repurposing other athletic equipment no longer usable for its original purpose - the source of carbon tubing is broken hockey sticks!

The sit ski that Kevin came up with is more than just a concept. It is a proven product. It survived a season of heavy use, and this year at least two more such skis will be put into service.

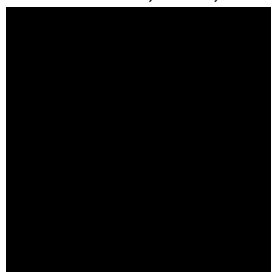
The product is ready for market, and demand for lightweight innovative custom Nordic sit skis exceeds supply. I searched for a sit ski frame for months, and nothing else I looked at fulfilled my requirements the way Kevin's sit ski does.

I am a strong believer in adaptive sports, having experienced myself and observed in others the health benefits and the quality of life improvements they afford. And the availability of great adaptive equipment will often make the difference between someone trying a sport and giving up, and getting hooked for life.

In summary, I would like to recommend Kevin's sit ski in the strongest possible terms.

Sincerely,

Vadim Kin, PhD, Mechanical Engineering



November 19, 2013

To Whom it May Concern:

Re: Manning Innovation Award – Kevin Priebe

Kevin designed and built a para-nordic sit ski for my use. I would like to endorse Kevin's high level of innovation based on the categories below.

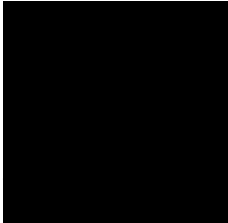
1. **Intellectual Achievement** – The design required a great deal of conceptual thinking to fit my particular needs. I am a disabled skier with a specific set of strengths and weaknesses. As the sit ski is to be used in racing, it had to incorporate a streamlined and functional design.
2. **Uniqueness and Originality** –Kevin designed a ski that incorporated the best features of other skis on the market as well as the unique requirements for my use such as accounting for my sensory deficits.
3. **Development** – Kevin and I began discussing the sit ski requirements last spring. He was then able to provide design iterations, build and fit the ski to my body.
4. **Commercialization** – This proven quality and functionality of this sit ski will lend itself to be customized for other clients in a commercial market.
5. **Benefits** – Canada is a top competitor in Paralympic and Nordic sports on the world stage. By creating and supplying innovation sit skis to athletes such as myself, Kevin helps Canadians to participate and excel in sport.

Please feel free to contact me for further information at 250-418-5174 or sklouttit@shaw.ca.

Regards,



Stacie Louttit



Regarding Manning Awards Endorsements from Individuals Qualified to Comment on the Success of the Innovation

I met Mr. Priebe in March of 2012 at the conference “Get out there” at the Blusson Spinal Cord Centre (ICORD) in Vancouver, Canada. The conference was organized by the BC Paraplegic Association and the purpose was to inspire people with different kind of disabilities to “get out” and participate in outdoor activities. We were both presenting on related projects. I was immediately impressed by Mr. Priebe’s presentation and his knowledge in the area of developing new functional equipment for people with impairments. The combination of a true spirit for innovation to develop the best products for people with impairments and his own experience as a peer makes him to one of the best I have ever met in this field!

After the conference we met several times and Mr. Priebe and I always had very fruitful discussion about new innovations, especially his ideas about the seating devises for different para sport such as kayaking and Nordic sit-skiing. He was always willing to share his ideas and wanted to get feedback to develop and produce the best products. Mr. Priebe’s ideas were in line with my interests and knowledge since I have been working with kayaking and sit-skating for persons with disabilities as a physiotherapist and innovator for more than 20 years. During the last 13 years I have also been doing research mainly in the area of adapted physical activities. In 2006 I received my PhD from the Karolinska Institute in Stockholm, Sweden on the effects of regular kayaking for persons with spinal cord injury. During my 1 year stay as postdoctoral fellow at the University of British Columbia (UBC) in Vancouver, Canada Mr. Priebe also participated in a in a study for people with motor complete spinal cord injury (SCI) where I was responsible as a senior researcher.

Addition to Mr. Priebe’s skills for innovations he has a fantastic ability to inspire all of us; specialists in the field, coaches, para-athletes and people with different impairments interested to perform outdoor activities. I think the spirit comes from the leap forward he has been able to make in his own life through innovation. Seeing the gaps in his own life he has blazed ahead of many of his peers with the assistance of the equipment he has developed. Thus, I would like to nominate Mr. Kevin Priebe to Manning Awards Endorsements from Individuals Qualified to Comment on the Success of the Innovation.

1) **Intellectual Achievement** - Specialists/Drs. and Clinicians are the ones that we expect to make these types of innovations. Mr. Priebe has worked, studied and listened to and been around many specialists throughout his life and it shows in the direction and specialty he has chosen to undertake.

2) **Uniqueness and Originality** - I was very impressed from my first meeting with Mr. Priebe with what I had seen from his unique products develop for people with impairments and I am looking forward to seeing future developments.

3) **Development** – Mr. Priebe broke down the build and fitting process by using 3D modeling and scanning to create an imprint using a CNC machine. Then Building and Shaping the Mold; then creating a fitted product. At the time of his presentation in 2012 he was still in the development testing stage. I was very excited and pleased with the direction he was taking and the results he was able to obtain.

4) **Commercialization and Benefits** - Athletes/potential para athletes all over the world many of which will never have the opportunity to participate without trail brazes like Mr. Priebe showing and sharing his experiences and knowledge. The benefits are life changing and affirming. Through sports, recreational activities and access we can change the outlook of people with disabilities, and also for each person in their effort to become independent people in the society. These changes have a multiplying effect on friends and family.

Stockholm, Sweden 2013-11-24

Sincerely yours

Anna Bjerkefors, PhD, RPT

The Swedish School of Sport and Health Sciences (GIH)
Biomechanics and Motor Control Laboratory and
Department of Neuroscience at the Karolinska Institute (KI)

Col Deborah S Page, USAF, BSC (Ret)



24 November 2014

Ernest C. Manning Innovation Award
Endorsement for Adaptive Sit Ski and Seating Innovation by Kevin Priebe

I have been the coach for the USA Canoe Kayak National Paracanoe Team since 2009. I have observed the evolution of adaptive seating over the years. Examples include glued and padded PVC pipe cages and adjustable segmented aluminum contraptions. These adaptations may have been satisfactory for a paddler out for a leisurely trip in a stable canoe or kayak, but they did not provide the proper level of support, comfort, and safety of Kevin Priebe's innovative seating for the narrow, relatively unstable racing canoes and kayaks of the Paralympic sport of Paracanoe.

Kevin's seats, whether on his wheelchair, sit ski, kayak, or off road vehicle, are anatomically fitted, minimizing pressure and friction problems while helping the athlete attain proper posture to engage every working muscle to propel the boat or sit ski forward. The purpose of his seating system has been to allow and encourage excellence, not merely participation. Kevin competes with a level of injury which is much higher than the current classification system anticipated, putting him at a great disadvantage, yet he continues to incrementally improve his seating system as he learns to paddle and ski better, while attaining greater physical fitness and joy in his life.

As an athlete, Kevin understands his needs for seating support during a variety of activities. Other athletes have asked non-athletes to build them carbon fiber seats at an expense equal to the cost of a high quality racing kayak, and the seats have been useless. One cannot innovate without proper understanding. Kevin's seats are unique and advanced compared to the majority of seating systems in use at the International Canoe Federation Canoe Sprint World Championships.

I endorse Kevin Priebe and his Adaptive Sit Ski and Seating Innovation for the Ernest C. Manning Innovation Award.

Respectfully yours,

Deborah S Page



To Whom It May Concern,

This letter is to endorse Kevin Priebe for the Manning Innovation Award. Kevin has provided an invaluable service to Para-Nordic skiers by designing and producing custom seats. Cross country skiing for those with spinal cord injuries is done in a sit ski. The lighter the sit ski and the tighter the fit of the chair to the athlete, the better the performance. Kevin's use of carbon fibre hockey stick shafts is ingenious as it results in a very light, strong but flexible sit ski. And furthermore it is recycling a product that would otherwise end up in a landfill.

Kevin's work in producing body fitting seats for sit skis is sorely needed in sports. The concept seems simple but yet there are no manufacturers offering custom seats. In Para-Nordic skiing the ability to control the sit ski, particularly if one does not have the use of the hips and/or abdomen muscles, comes from turning the shoulders. If you imagine a boot on your foot that is loose so that you can have some room to turn your ankle without making the boot turn as opposed to a tight fitting boot where every movement of the ankle instantly moves the boot, then you can see how a body fitted chair would work. In competition, the sit ski must respond immediately to any changes of direction desired by the athlete because if it doesn't one is wasting energy and time, which could be the difference between being on the podium and not on the podium.

Kevin's innovation in designing and producing body fitted seats to fit any apparatus - sit skis for Para-Nordic skiing or wheelchairs for every day use - is an innovation that is helping many wheelchair users achieve better results.

Regards,

Tony Chin
BC Para-Nordic Team Coach
Cross Country BC

Statement of the Economic or Social Benefits to Canada, Resulting from the Successful Commercialization

The sit ski and seating innovations have had an a significant impact on the quality of my life contributed both socially and economically. Giving me the opportunity to train and race across Canada and the US. Meeting and training with other athletes and coaches. Going forward I would like to continue to share and provide assistance to other para athletes. Even if contributing to the builds of other providers there is still a beneficial opportunity to grow and evolve. It has provided job opportunities for myself and my business partner James. In the future I can see us hiring an employee to assist us. We have the opportunity to help Improve the health of Canadians who like myself have a major physical disability. Having a disability can have social consequences; the benefits of being involved in sports can help fill these gaps and give opportunities to those of us that need them the most.

I have attached the finding of a study I recently took part in.

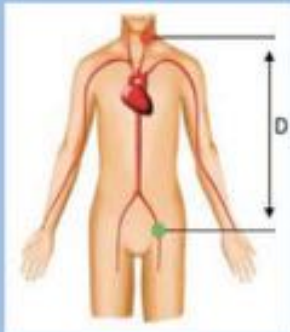


Dear KEVIN PRIEBE,

Thank you for volunteering your time to participate in our study entitled 'Establishment of Normal and Reference Values of Arterial Stiffness in Spinal Cord Injury'. Our research looked at individuals with a motor-complete spinal cord injury (SCI) between the levels of C4 and T6. We gathered data on the health of each participant, in particular cardiovascular health. The study is currently ongoing. However, we are happy to present you with your results.

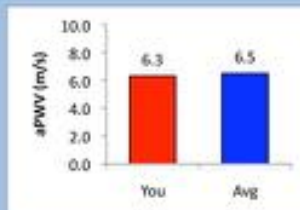
- Krassioukov Lab, 2013

The primary outcome measure of this study is **aortic pulse wave velocity (aPWV)**. aPWV tells us how stiff your arteries are and indicates the risk of someone developing cardiovascular disease. It is assessed by placing one device at the neck and another at the groin to measure how fast blood flows from the heart to these two points.



YOUR RESULTS:

This graph shows your aPWV score (red) and the average (blue) for able-bodied individuals your age.



Your aPWV is comparable to able-bodied individuals your age.

BLOOD PROFILE

TEST	YOUR RESULTS:	NORMAL RANGE:
Glucose fasting (mmol/L)	4.3	3.3 – 5.5
Cholesterol (mmol/L)	3.41	2.00 – 5.19
Triglyceride (mmol/L)	0.85	0.45 – 2.29
HDL-Cholesterol (mmol/L)	0.74*	>0.90
LDL-Cholesterol (mmol/L)	2.28	1.50 – 3.39
Cholesterol:HDL Ratio	4.61	<4.9

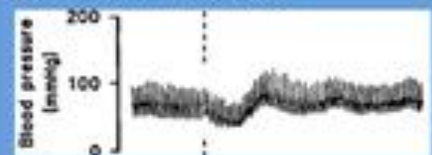
* = result outside of normal range

Kevin Priebe Copy Right 2014

We measured your blood pressure when you were lying down (supine) and when you were seated. Below are the average blood pressure values in these two positions. The first number is your systolic blood pressure (when the heart beats). The second number is your diastolic blood pressure (when the heart relaxes).

Supine blood pressure (mm Hg)	119 / 65
Seated blood pressure (mm Hg)	122 / 62

The **Sit-Up Test** looks at your blood pressure response to change in position from lying to seated. A normal response is an increase in blood pressure when sitting up:



Whereas in people with orthostatic hypotension, blood pressure drops significantly when sitting up:

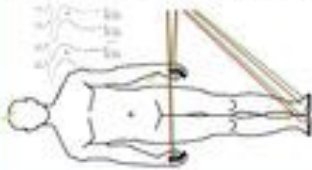


YOUR RESULTS:

You did not experience orthostatic hypotension. Your blood pressure increased when you sat up.

2014 Application

The **sympathetic skin response** test involves stimulating nerves in the wrist and ankle and measuring sweat responses in the hands and feet. SSR tells us about your **autonomic nervous system** which controls bodily functions such as heart rate, blood pressure, sweating and much more.



YOUR RESULTS:

We did not observe any sympathetic skin responses, which suggest you have an **autonomically complete injury**.

Your new assessment of neurological level of lesion implies that you have a **sensory & motor complete (AIS A) lesion at T1**.

A **DXA Scan** was performed at ProHealth Clinical Research Centre and provided us with the following information on your **body composition**.



YOUR RESULTS:

Height: 1.76 m
 Weight: 89.0 kg
 BMI (see table): 28.8 kg/m²
 Body fat percentage: 33.0 %
 Lean mass: 56.7 kg

BMI Classifications	
Normal	18.5 - 24.9
Overweight	25 - 29.9
Obese	30 - 34.9
Severely Obese	35 - 39.9
Morbid Obese	40+

FITNESS (VO₂PEAK) TEST

The **VO₂peak test** tells us about your fitness level by measuring the amount of different gases you breathe in and out during exercise on an arm cycle.

YOUR RESULTS:

This graph shows your VO₂peak value (red) and the average VO₂peak for people with a cervical (yellow) and thoracic (blue) SCI. A higher VO₂peak value means a better fitness level.



Peak heart rate: 147 bpm

Peak power output: 70 Watts

In Conclusion it is vital that we continue to be active and be contributing members of society no matter what impairments we may face. There is often a solution its a matter of first understanding the question.

Thank You

Kevin Priebe