Vanderplaats Research & Development, Inc.
Creators of Design Optimization Technologies

VR&D Fall 2013 Newsletter

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1 VR&D Founder

1.1 An Interview with Dr. Garret Vanderplaats
Introduction by Professor Lucien Schmit

I have known Gary Vanderplaats for 45 years. He is an extraordinary engineer and a wonderful friend. During his career he has done more than any other individual to make the original structural synthesis concept into a practical commercially successful set of design optimization tools. His leadership in developing well documented commercial codes is legendary. Gary has also done a great deal to advance multidisciplinary design and analysis concepts.

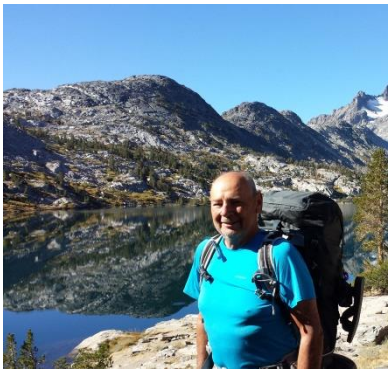
Gary is what I call a "go-to man," the sort of person you can take your problem to with good expectations for a solution. If ever I was stuck on a desert island, Gary would be my first choice as a savior. Many of you may not know it but Gary is an extraordinarily versatile individual. Early in his career he felt the need for a computer at home so he built one from a kit on his own. He can take most cars apart, fix them, and put them back together in working order. He can probably out walk most people half his age. He is also very facile with tools of all kinds. Fixing up an old house or building a new one are well within his ken.

In closing these brief remarks I want to offer my earnest congratulations to Gary Vanderplaats on a life well lived----it is indeed my honor to know Gary Vanderplaats as a closely held friend and a distinguished colleague.

Lucien Schmit July 2013

1.1(continued)An Interview with Dr. Garret Vanderplaats

Sample Interview Question



Interviewer: How do you see the future of optimization?

Gary Vanderplaats: I think at this point optimization has demonstrated itself to be a very valuable design tool. In fact, Lucien Schmit and I were talking about this some years ago and he said "I'm now confident that optimization has a future because people have decided they can make money off optimization." That's when several companies were being created with their own programs to promote optimization. So I think the future is solid. I think we've established that it works.

To read the fascinating interview of one of the most influential persons in the numerical design optimization community please link to the full interview here: GaryVanderplaatsInterview.pdf

2 *Twenty Year Service Recognition*

2.1 Pam Hoskinson

Pam Hoskinson receives a plaque and a Broadmoor Hotel Spa gift certificate from VR&D CEO Gary Vanderplaats in recognition of her twenty years of service at VR&D

The plaque reads: *Presented to Pam Hoskinson, 2013, in recognition of twenty years of outstanding contributions to Vanderplaats Research & Development, Inc. Special thanks for your many superb contributions to sales, client support, and office management. Your dependability and professionalism supporting our clients and co-workers has been essential to establishing VR&D as the leader in the optimization field. From your colleagues at VR&D*

3 New Distributor

3.1 Hengstar - China

VR&D has a new distributor in China. Hengstar is an engineering company, based in Shanhai, China, with focus on providing CAE and CAD solutions for clients across the globe in sectors ranging from automotive to alternative energy. Hengstar's core expertise lies in applying solutions to significantly improve product design process both in terms of cost and performance.

VR&D welcomes Hengstar to its family of distributors around the world. For more information on Hengstar, please visit their website:
http://www.hengstar.com/index.php?language=en

4 VR&D Workshops

VR&D offers one-day workshops, and training classes on optimization and related topics. The workshops are designed to give attendees a brief overview of the capabilities of our software, teach them optimization concepts, and help them use our software in solving their problems. The workshops are offered at our Novi MI office throughout the year. We currently offer workshops, and training classes on the following topics:

Structural Optimization (Genesis and Design Studio)
This workshop is designed to demonstrate the ease of running optimization using Design Studio and Genesis. The workshop covers topology, sizing, shape, topography, topometry and freeform optimization problems. Hands-on exercises will be solved by the attendees.

General Optimization (VisualDOC)
This workshop is designed to highlight how VisualDOC can be used to add design optimization capabilities to an existing analysis. An overview of the features present in the software along with several analysis integration techniques are presented. Attendees will have the chance to solve example problems for better understanding.

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Workshops Continued from previous page

Freeform and Composite Optimization
This workshop will provide an in-depth look at freeform and composite optimization using GENESIS and Design Studio. In this workshop we will look at the capabilities of GENESIS to optimize laminated composites. Explore Freeform Optimization and a new shape optimization capability. This special shape optimization capability allows the user to find the best location and shape of rib patterns that stiffen solid structures. It can also be used to find the best location of grids in any type of structure

Shape Optimization
This workshop provides an in-depth look at shape, topography, and freeform optimization using Genesis and Design Studio. In this workshop, we will look at the basics of shape optimization. It also goes through Topography optimization and explores Freeform Optimization, a new shape optimization capability. This special shape optimization capability allows the user to find the best location and shape of rib patterns that stiffen solid structures. It can also be used to find the best location of grids in any type of structure.

Composite and Frequency Response Optimization
This workshop provides an in-depth look at optimization using frequency response analysis using Genesis and Design Studio. The beta method, used for minimizing the maximum value, is used to optimize based on frequency response. In this workshop we will also look at the capabilities of Genesis to optimize laminated composites. Optimization for layer thickness, angles, and shape are also covered.

Non-Linear Response Optimization
This workshop provides an in-depth look at optimization of non-linear responses using Genesis and Design Studio. The Equivalent Static Loads (ESL) method is briefly presented. The ESLDYNA interface, which uses LS-DYNA to solve the non-linear analysis and Genesis to perform the optimization, is explained. In this workshop, we will look at the different optimization capabilities of Genesis. We will also look at a plugin to Design Studio that serves as a graphical interface to setup and run the ESLDYNA interface.

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Workshops Continued from previous page

Please check our website (http://www.vrand.com) for future workshops, training, and the latest announcements. The upcoming training class on GENESIS Basics is scheduled for October 16 - 18, 2013 (Novi, Michigan).

VR&D will continue offering on-site classes and custom made classes. Please contact us (training@vrand.com or 1-248-596-1611 x101) for more information or simply wait for our announcements to be sent to your e-mail address.

5 *VR&D Webinar Series*

Starting in 2011, VR&D began our Webinar series which includes presentation on topics related to optimization. The presentations are given by VR&D staff, as well as our customers and collaborators. VR&D has presented webinars on the following topics:

1. Large Scale Optimization with LSDYNA - 29 August 2013 - Dr. Phani Adduri
2. Utilization of GENESIS Design Optimization in Composite and Hybrid Structures - 11 April 2013 - Dr Brian Knouff
3. Design Optimization of Automotive Structures - 20 Sep 2012 - Mr. Srinivasan Laxman
4. Reducing Mass on F1 Vehicle Design using Structural Optimization - 28 June 2012 - Mr. Martin Gambling
5. Topometry Optimization: Features, Methods and Applications - 3 May 2012 - Mr. Juan Pablo Leiva
6. MDO: Past, Present and Future - 15 Mar 2012 - Dr. Gary Vanderplaats
7. Test Analysis Correlation using Design Optimization - 26 Jan 2012 - Mr. Gary Quinn
8. Design Optimization and Process Integration with VisualDOC - 1 Dec 2011 - Dr. Santosh Tiwari
9. Structural Optimization Method and Techniques to Reduce Radiation Noise - 20 Oct 2011 - Dr. Phani Adduri
10. Full Automobile Topology Design With Multiple Load Cases Including Inertial Relief - 8 Sep 2011 - Mr. Gary Quinn
11. Structural Optimization using Design Studio - 23 June 2011 - Dr. Brian Watson
12. Structural Optimization with Genesis - 26 May 2011 - Mr. Juan Pablo Leiva
13. Fifty Years of Structural Synthesis - 28 April 2011 - Dr. Gary Vanderplaats

Recordings of VR&D webinar's are available for on-line viewing.
To access the recordings:

1. Go to http://vrand.webex.com
2. Click on the View Event Recordings link in the top right hand side of the page
3. Click on the Recording to view and follow the instructions for playback.

6 Recent Software Releases

6.1 VisualDOC 7.2 (July 2013)

VisualDOC is a multidisciplinary design, optimization, and process integration software. It is a tool for design process definition, integration, execution, and automation. The design modules included are Optimization, Design of Experiments, Response Surface Approximation, and Probabilistic (Robust and Reliability-based) Design. VisualDOC can be used to add these modules to almost any analysis program.

VisualDOC 7.2 includes several major and minor changes aimed at improving the user-interface and performance as compared to version 7.1.

- The highlight of this release is batch processing of design points and the addition of parallel simulation capability to VisualDOC.

- All the design components (Optimization, Design of Experiments, Response Surface Approximation, and Probabilistic Design) and the For Loop component can potentially drive their sub-flow in parallel. The parallel simulation capability in VisualDOC is primarily intended for running the user's analysis program in parallel (launch multiple runs on local and remote computers simultaneously with different input data). In VisualDOC 7.2, a design component (e.g. Design of Experiments) can generate multiple sets of inputs (multiple samples) at once, each of which can be evaluated simultaneously by launching multiple instances of the user's analysis program with different input data. Both these capabilities help in speeding up the simulation process.

- A new component that communicates data with the Genesis software is also added. This new component does not require the user to manually specify how to read/write genesis data files. Instead, this new component automatically parses and shows the supported type of input data in a tree table, and the user can also easily add the outputs to be extracted using the provided data filters.

- Other modifications include improvements to data viewer, algorithmic enhancements and more user control in BIGDOT 4.0, new examples for MDO.

6.2 BIGDOT 4.0 (December 2012)

Version 4 of BIGDOT contains two significant enhancements over earlier versions. One is algorithmic and the second provides more user control. The algorithmic change is in the way internal multipliers are calculated. The new method is more efficient in terms of iterations to achieve an optimum, but takes significantly more computational time than the original method. Therefore, the new method is recommended for problems where there are expected to be less than about 2000 active constraints. The user control option now allows the user three levels of default parameters. With this, the user can choose to achieve a near optimum very quickly or can choose to continue the optimization process to achieve a more precise optimum.

7 *Contacting VR&D*

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