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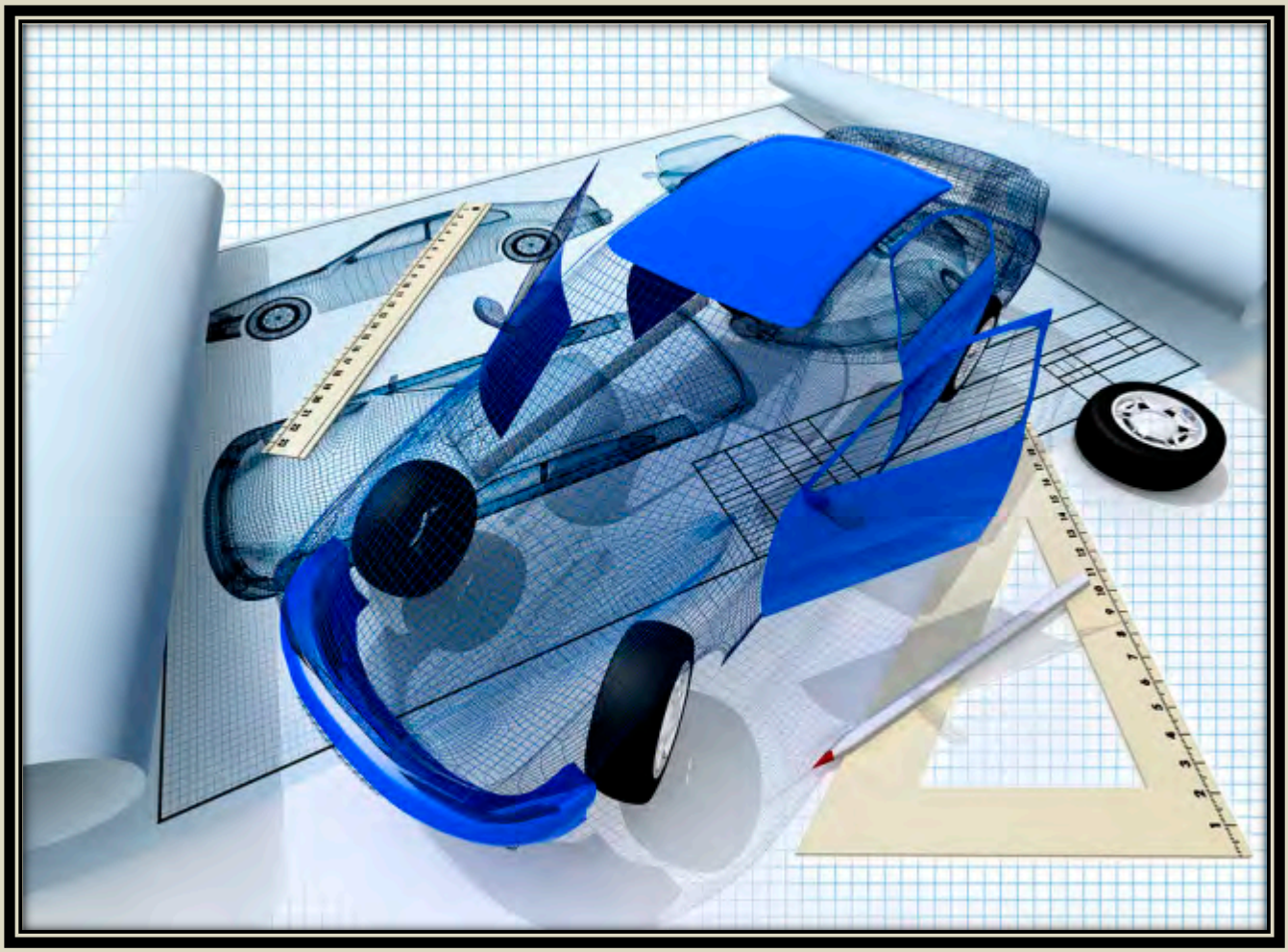
# FEA Information Engineering Solutions

Volume 1, Issue 9, October 2012



**Inside This Issue**

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LSTC Livermore Software Technology Corp.

For Information: Livermore Software Technology Corporation www.lstc.com
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**FEA Information** Inc. is a publishing company founded April 2000, incorporated in the State of California July 2000, and first published October 2000. The initial publication, FEA Information News continues today as FEA Information Engineering Solutions. The publication's aim and scope is to continue publishing technical solutions and information, for the engineering community.

**FEA Information Inc. Publishes:**

FEA Information Engineering Solutions

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FEA Information China Engineering Solutions

**FEA Information Engineering Solutions**:

A monthly publication in pdf format sent via e-mail, additionally archived on the website FEA Publications. www.feapublications.com

**FEA Information China Engineering Solutions**

The first edition was published February 2012. It is published in Simplified and Traditional Chinese in pdf format. Published : February, April, June, August, October, December. The China Solutions is archived on the website FEA Publications. www.feapublications.com

To sign up for the Traditional, or Simplified edition write to yanhua@feainformation.com

**FEA Information Engineering Journal: ISSN #2167-1273, first published February, 2012**

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| **Issues Now On Line** | Volume 1 Issue 1 February 2012 Compilation | Volume 1 Issue 2 March 2012 Metal Forming | Volume 1 Issue 3 April 2012 FSI | Volume 1 Issue 4 May 2012 Aerospace | Volume 1 Issue 5 June 2012 Electromagnetics |
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| Volume 1 Issue 6 July 2012 Blast & Impact | Volume 1 Issue 7 August 2012 Constitutive Modeling | Volume 1 Issue 8 Sept. 2012 Optimization | Volume 1 Issue 9 Oct. 2012 Simulation | | |
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**2013 Events and Training Courses**

Now being accepted for publication.

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**FEA Information Engineering Solutions Mandarin and Simplified Chinese**

Sent this month by Yanhua Zhao

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**Software Offering:**

Don't miss the information on the inside cover LSTC's SMP Version

**Main Article**

Xinhai Zhu and Li Zhang of LSTC, Sheet Metal Forming. Additionally, this can be read in Chinese – if you have friends that are in China have them contact yanhua@feainformation.com

**The Journal for October**

Dedicated to papers on Simulation

**Sincerely, Marsha Victory, Trent Eggleston, FEA Information**

Xinhai Zhu, Li Zhang

LSTC

## INTRODUCTION

Unfolding of flanges is one of the first steps in a stamping die development process. Immediately after tipping, binder and addendums are built for unfolding of flanges. According to process considerations (trim, draw depth, and material utilization, etc.), these addendum are built either in parallel, or perpendicular to the draw die axis, or they can be built tangentially off the main surface, or any combinations of the three scenarios. Trim lines are developed by unfolding the flanges in finished (hemmed or flanged) position onto these addendums. Addendums length in some areas may have to be adjusted to accommodate the unfolded trim lines.

Trim line development is very critical in hard tool development. Inaccurate trim lines lead to trim die rework, amount to hours and hours of welding, re-machining and spotting of trim die components. Up until recently, there is no flange unfolding capability existed in LS-DYNA$^{\dot{O}}$. A major development effort produced a new keyword *CONTROL_IMPLICIT_UNFLANGING, enabling LS-DYNA users to conduct an 'unflanging' simulation within the software. This is a multi-step implicit static method, and detailed descriptions of the keyword can be found in the draft version of the keyword manual link: ftp://user:computer@ftp.lstc.com/manuals/DRAFT

## MAIN FEATURES

The inputs to the keyword are:

1) Flanges in flanged or hemmed position – portions of the flanges may overlap the addendum or main part surface, and these areas of the flange meshes are constrained automatically with the variable DIST. DIST is typically set as little more than ½ of the flange thickness.
2) Addendum surface meshes – the addendum surfaces must be large enough to contain the unfolded flanges in unflanged shape. Addendum meshes can be meshes used to describe the tooling mesh. Tooling mesh can be created in *LS-PrePost* under menu option *Mesh/AutoM/Deviation*.

3) SPC tolerances to automatically fix unmoving portion of the flanges – this is done through the use of the variable DIST.
4) Solution control variables – estimated number of unbending, ranging from 10-100; unflanging and normal stiffness, ranging from 0.1-10.0; iteration limit for the first phase of unflanging, typically at 400.
5) Additional implicit control cards – this keyword is used in conjunction with option 1 of the *CONTROL_IMPLICIT_FORMING. Termination is determined by DELTAU in *CONTROL_IMPLICIT_TERMINATION, typically between 0.0005 and 0.001. An initial step size is typically 0.1 specified using *CONTROL_IMPLICIT_GENERAL. Termination "time" is usually given as 100.0 in *CONTROL_TERMINATION, sufficient in most cases.

The outputs of the simulation are unfolded flanges, and therefore, trim lines, in D3PLOT files. Since this is an implicit method, fully integrated shells are recommended. Deformable flange should have reasonably shaped elements, as one usually would do for a sheet blank. This kind of mesh can be constructed using *Size* method in *Mesh/AutoM* in LS-PrePost. Flanges and tools must not share the same nodes – this is easily done with *Detach Element* function in LS-PrePost. The flange unfolding direction is determined by the normals of the flanges and tool surfaces. The normals of to-be-unfolded flange side and the tool surface must point at each other. Contact is modeled with one-way forming type. Adaptive mesh may be supported in the future. Double precision executable is required.

Figure 1 below shows unfolding of an undercut flange. The deformable flange is unfolded onto a flat tool surface (rigid). This example tests the keyword capability in handling of multiple unbends and undercut scenario. Flange edge lengths before and after unfolding are reasonable. The computing is very fast, as shown in Table 1, where model and CPU time are listed.

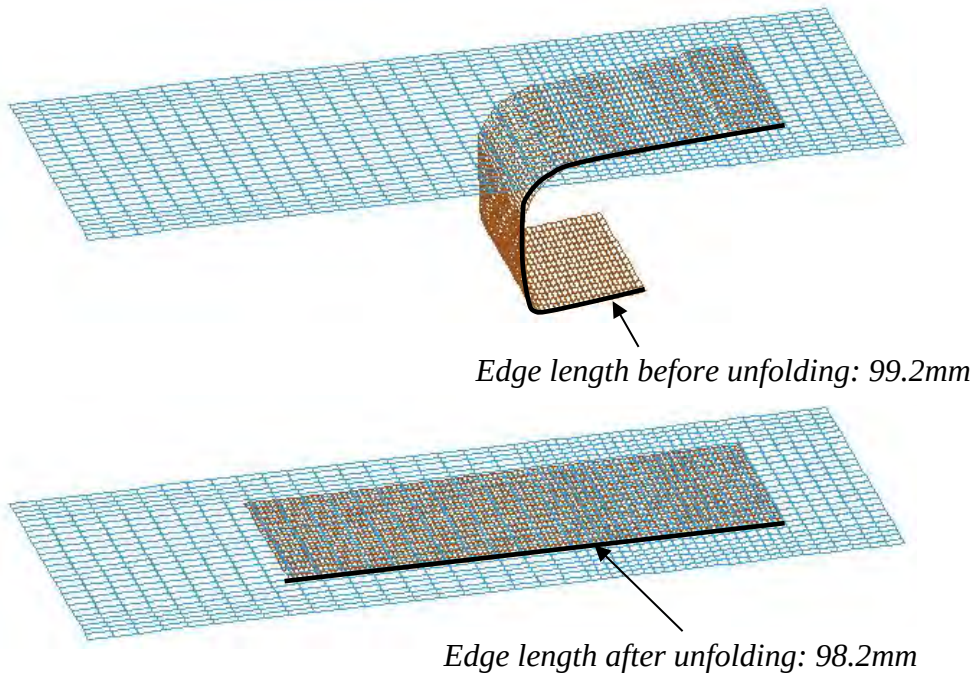


**Figure 1** Unfolding of an undercut flange.

Figure 2 shows unfolding of a hemmed flange around an automotive door corner. This example verifies the keyword capability in dealing with a near 180 degree unfolding. The unfolding will be a first step in simulating a flanging and hemming process, where accurate starting position and shape of a flange is needed. Flange lengths before and after unfolding are compared and deemed reasonable. The computing had no difficulty, and is very fast, as shown in Table 1 on the next page.

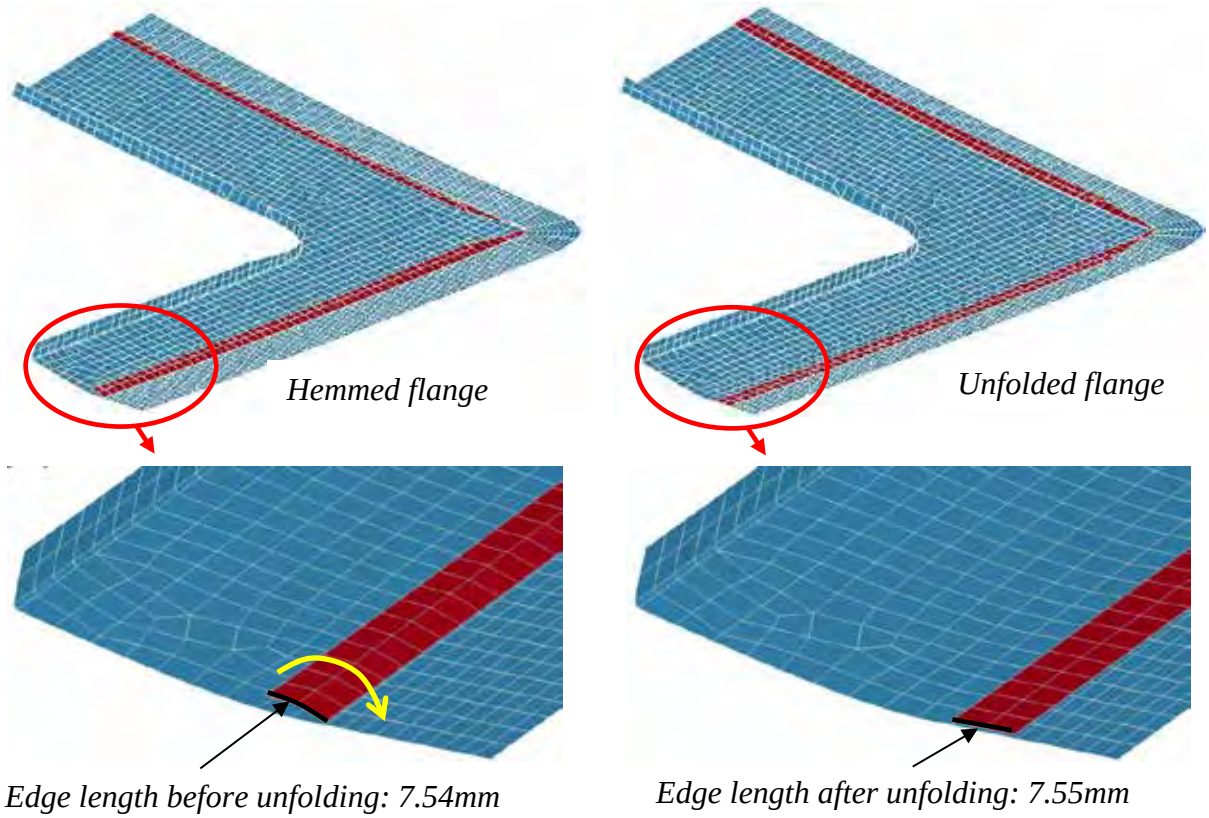


**Figure 2** Unfolding a hemmed flange of a door corner.

| | #Flange element | # Tool element | # of implicit steps | Computing time (sec) on 8 CPUs, SMP |
|---|---|---|---|---|
| **Undercut flange** | 1386 | 1196 | 158 | 50 |
| **Door corner** | 203 | 2424 | 101 | 19 |

**Table 1. Model and CPU information**

A more production intent example can be found in the keyword manual.

## DISCUSSION/CONCLUSION

Unfolding of flanges and hemmed flanges is a very important step in stamping process and process simulation. This is now possible with the new keyword *CONTROL_FORMING_UNFLANGING. The new keyword is robust, reliable and fast. Future enhancements include handing of the adaptive meshes and input simplification.


**Initiated to track the aggregate performance trends of high performance computer systems and engineering software.**

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**Vendor/Submitter Org.:** SGI®/HPC Applications Support
**Submitted:** 10/07/2012
**Computer/Interconnect:** SGI® Rackable CH-C2112 cluster/IB QDR
**Processor**: Intel® Xeon® E5-2670 @2.60GHz Turbo Enabled
**Submission Date**: October 07, 2012

| #Nodes x #Processors per Node x #Cores Per Processor = Total #CPU | Time (Sec) | Benchmark Problem |
|---|---|---|
| 64 x 2 x 8 = 1024 | 1887 | car2car |
| 32 x 2 x 8 = 512 | 431 | 3 Vehicle Collision |
| 16 x 2 x 8 = 256 | 60 | neon_refined_revised |
| | | |

**LS-DYNA and d3VIEW Blog**

http://blog.d3view.com/

**MPP LS-DYNA Intermittent Profiling Information**
**Posted on September 26, 2012 by Suri Bala**

During MPP LS-DYNA execution, often there is a need to know how each of the "threads" are doing in terms of overal CPU utilization. Until now, one has to wait till the job is fully finished so we can review the load-balance information from the main D3HSP file.

From LS-DYNA 971 r7 onwards, there is now a new "sense-switch" control named "prof" that can be now used to output CPU utilization while the job is running. This is a great feature to probe long-running jobs and to ensure that the run is performing well.

The feature was added by Dr. Jason Wang in MPP LS-DYNA

PS: You can also review "Time per zone Cycle" in the main-processor's GLSTAT file to review the CPU utilization but may not provide a complete picture of how the slave "threads" are doing.

```
lpri    toggle implicit lin. alg. solver output on/off
nlpr    toggle implicit nonlinear solver output on/off
iter    toggle implicit output to d3iter database on/off
prof    output timing dat to message file and continue
```

http://www.dynasupport.com/

**The LS-DYNA support site**

At this site you will find answers to basic and advanced questions that might occur while using LS-DYNA. Furthermore it will provide information about new releases and ongoing developments. The content will be regularly updated with answers to frequent questions related to LS-DYNA.

LS-DYNAsupport will not provide information on activities of your local LS-DYNA distributor as seminars, promotions, etc. We may ask to check the local sites for any kind of non-technical information.

**Recent Changes - please visit the site for the pdf files.**

October 25th
Install a new network license (Microsoft Windows)

October 23
The tension test

October 23
A pathological case of volume locking in triangular elements

October 23
Material model for TRIP-steels

October 23
History Variables for certain material models

**Oasys LS-DYNA UK Users' Meeting 2013**
Wednesday 16th January 2013

The tenth in a series of update meetings for Oasys LS-DYNA Users will be held at our office in Solihull on Wednesday 16th January 2013.

Please note: The Meeting will run as a half day event this year with registration commencing at 1:30pm. The decision to shorten the event was taken as the European LS-DYNA Conference is also running in the UK in 2013.

As in previous years this event will bring together around 80 users of the Oasys and LS-DYNA software to provide information on upcoming features of Oasys and LS-DYNA, and to learn more about current and new applications, as well as other related software products.

We are looking forward to talks from Yun Huang (LSTC) and the Oasys team at Arup.

The event will be followed by a complimentary meal at The Boot Inn in Lapworth. Please ensure you register in advance to attend this evening meal.

**Registration**

This event is free of charge. To register for the event and the evening meal simply send an email with your company/affiliation and contact details to Katherine Groves katherine.groves@arup.com . Please also let us know if you have any particular dietary requirements when you register.

Please note: in line with our company sustainability policy we do not plan to provide printed copies of the presentations for each attendee at the event; the presentations will be made available to download after the event. If you particularly require a printed copy on the day please let us know when you register.

**Agenda**

http://www.oasys-software.com/dyna/en/events/users_jan-13/Provisional%20Agenda%20Oasys%20LS-DYNA%20Users%20Meeting%202013.pdf

A provisional agenda for the day available. These details will be confirmed closer to the event date.

**Training Courses**

The following training courses are provisionally scheduled around the time of the Oasys LS-DYNA UK Users' Meeting:

Thur 17th - Fri 18th Jan
NHV & Frequency Domain Anaylsis in LS-DYNA

The course costs listed above are per attendee and do not include VAT or any travel / accommodation expenses. For more details please follow the link to the course page.

**Venue**

The event will be held at The Arup Campus, Blythe Valley Park, Solihull, B90 8AE. Blythe Valley Park is located at junction 4 of the M42; please click here for a PDF map. Details for public transport to the Blythe Valley Park can be found on the Blythe Valley Park website.

**Meal after the event**

The meal following the event will be held at The Boot Inn, Old Warwick Road, Lapworth, B94 6JU. The size of the restaurant is limited so please ensure you confirm to us that you plan to attend to avoid disappointment on the night. For a detailed map of the location please click here.

**Contact Details**

If you would like more information on this event please contact:

Katherine Groves
Oasys LS-DYNA Project Administrator, Arup
T +44 (0) 121 213 3291
E katherine.groves@arup.com

Participant Distributor Showcase

For information on the latest offering LS-DYNA SMP – Upgrade Your Winows Workstation contact Vincent LAPOUJADE - v.lapoujade@dynasplus.com


Vincent LAPOUJADE leads a team of engineers and staff, in technical support, sales, and consulting, for LS-DYNA. He has been dedicated to LSTC's suite of software products for many years, and a long standing alliance with LSTC. Among Vincent's and DynAS+ objectives are to concentrate know-how and expertise to satisfy the customers in France.

**2013 will have special emphasis on training courses for the new features in LS-DYNA.**

**For information on pricing, demonstration license, SMP Offering, or future training contact:**
Vincent LAPOUJADE - v.lapoujade@dynasplus.com
www.dynasplus.com


**Matereality releases new app suite for product development and material data management**

Press Release October 18th, 2012: Ithaca, NY

Matereality's 6.0 Release features a redesigned user interface with a new applications suite now compatible with mobile devices. The company continues to drive innovation to allow engineers to find, understand and use traceable material data for new product development. Matereality delighted CAE analysts when it released its acclaimed CAE Modelers in 2010. They have proven to be incredible time savers for engineers, letting them perform the often-complex conversions to create CAE material cards in a predictable manner. With 6.0, a new Material Model Library app lets them catalog and store their material cards alongside their raw material data.

Release 6 encourages companies to transition to material databases that provide core value to their product engineering teams. These are dedicated databases that contain highly relevant measured properties of the actual materials used in their products. "In today's analysis-led design (ALD) environment, where major design decisions are based on the outcomes of CAE, using material data of unknown origins has long term consequences. Over the past 5 years we have seen companies invest in dedicated databases, from our vantage as the source for material data to over 800 manufacturing companies", says Hubert Lobo, who runs both DatapointLabs and Matereality.

The new interface moves away from traditional website navigation with app based software tailored to diverse user types. GridView lets users navigate their personal database, workgroup database or an entire enterprise database. Data administrators use the Manage app. Test engineers and librarians can use the Load Data app to add material data to their database. With Smart MouseOvers, the user can preview pertinent data including properties, analytics and models before diving into a dataset. The iPad-ready DataViewer enhances the user experience for visualization of complex material data with instant graphing of digital data, unit conversions and enhanced Excel connectivity. "We have engineers from over 450 product development teams using our cloud. We are excited to enable faster access to material data and software applications right at log in. This will allow a wide cross-section of users to adopt a common platform that feels like it has been designed specifically for them", says Paul Klinger, Sales Director, Matereality.

The Matereality cloud today contains over 50,000 experimental datasets on over 8,000 materials, comprising one of the largest collections of design properties in the world today. While the content is primarily intended for internal use by corporate design groups, selective sharing is possible to allow collaboration between colleagues or companies cooperating on a development program. A material supplier may, for example, exclusively share its privately held high strain rate tensile properties for crash simulation with an automaker's design team using Matereality. Such 'social' interaction can enable data starved design groups to have access to high-value product-relevant material data while often enabling a sale for the supplier. Free databases are also exposed, creating pathways to connect design teams to additional material data from pedigreed sources.

**About Matereality**

Matereality, L.L.C., based in the United States, operates private and public cloud material databases for use in product design and manufacturing. Matereality's ready-for-deployment patented technology provides material databases and solutions for different needs, budgets and company sizes: a Personal Database for one user, a WorkGroup for up to twenty users, or a Material Data Server for a large manufacturing enterprise. Each database can collect and store any properties of any materials. All databases are empowered by a suite of web-based software that allows users work to with material data, for trend visualization, CAE modeling and database building. Support services include material data loading and material testing to populate the database with accurate data. The company serves a diverse user base including automotive, appliance, tier-one, material suppliers and processors, electronics, mold makers, medical devices, and consumer product verticals.

**For more information, visit**

www.matereality.com

email to info@matereality.com

telephone 607-257-1784

95 Brown Rd. #102, Ithaca, NY 14850.

http://investors.cray.com/phoenix.zhtml?c=98390&p=irol-newsArticle&ID=1743321&highlight=

**IU to Acquire Nation's Fastest University-Owned Supercomputer**
**Oct 09, 2012 --**

Indiana University and Cray Inc. (NASDAQ: CRAY) announced today that the university plans to replace its largest supercomputer system, Big Red, with the fastest university-owned supercomputer in the nation. Named Big Red II, the next-generation Cray XK supercomputer will be capable of one thousand trillion floating-point operations per second, or one petaFLOPS.

Big Red II will be developed and deployed through a joint effort between Cray and IU to provide an innovative supercomputer that advances research particularly in areas related to big data. The system will combine the longstanding leadership of Cray supercomputers and IU-developed technology for movement, management and analysis of massive data sets. The university plans to install the new system in its state-of-the-art data center in spring 2013.

"IU's new Cray supercomputer will ensure we stay at the forefront of the use of high-speed and data-intensive computation in some of the most vital and complex research in the world, and the decision to acquire the fastest university-owned supercomputer is the latest evidence of how important the highest speed computation is to our researchers and scientists," IU President Michael A. McRobbie said. "It has enabled them to obtain extensive funding for their research that they would not otherwise been able to get and has enabled them to continue to stay at the leading edge of their disciplines.

"Big Red II will accelerate discovery and allow new research by hundreds of IU scientists and scholars right across the university including in medicine, biology, physics, chemistry, astronomy, network science, sustainability science, global climate research, public health, and, of course, informatics and computer science. It will also play a major role in the recruitment of new faculty in these and other areas who will make use of Big Red II and its huge data processing capabilities."

The new system will be unique among supercomputers owned by U.S. universities. The new Cray will have more than 21,000 processor cores, high-performance GPUs, and an extremely fast Cray Gemini Interconnect. It will include the newest NVIDIA GPU accelerators and the latest AMD processors with 16 cores each. Big Red II represents a substantial capability leap forward for IU over Big Red's 4,100 cores.

"We are excited and honored that Indiana University has selected a Cray supercomputer to become the next Big Red system," said Peter Ungaro, president and CEO of Cray Inc. "The university is widely known as a leader in the academic circles of high performance computing, and we look forward to collaborating with IU and providing their researchers, scientists and students with the unique performance and capability found only in a Cray."

"Big Red II is the next step in executing IU's strategic IT plans in support of the university," said Brad Wheeler, IU vice president for information technology and CIO. "Using the original Big Red, IU researchers have secured more than $253 million in grant funding, and we foresee a similar positive impact being made by Big Red II. The key importance of these systems has been in the discoveries they have enabled, represented in thousands of published papers produced by the IU scientists who have used them. Big Red has been an extraordinary value for IU over its almost seven years of service, and the frontiers with Big Red II will be even more expansive."

Andrew Saykin is one of many IU researchers whose important work will be aided by the new supercomputer.

"Data sets of unprecedented scope can facilitate new discoveries regarding the brain, genome, disease and therapies but computational power has become a major bottleneck to scientific progress," said Saykin, Raymond C. Beeler Professor of Radiology at the IU School of Medicine and director of the IU Center for Neuroimaging. "To analyze the entire human genome in relation to longitudinal changes on brain MRI and PET scans in over 800 individuals, we need significantly more computing power than is available today. This new supercomputer is an exciting development that will undoubtedly enable new discoveries by many investigators at IU and beyond."

IU's Pervasive Technology Institute (PTI) leaders already have plans for using Big Red II to develop new techniques and tools, including Beth Plale, PTI managing director and director of IU's Data to Insight Center; Andrew Lumsdaine (director) and Thomas Sterling (chief scientist and associate director) of IU's Center for Research in Extreme Scale Technologies; and Geoffrey C. Fox, director of IU's Digital Science Center.

"Cray's leading capabilities for petaFLOPS systems, PTI innovations that create new software tools, and IU Research Technologies' ability to provide university-wide support to all disciplines are a highly unique combination that will accelerate many frontiers of research," said Craig Stewart, PTI executive director and associate dean of research technologies. "This is a first in my more than three decades of work on research technologies."

The original Big Red, which was the fastest university-owned system of its kind when it was installed in 2006, is now considered old by supercomputer standards. In fact, when it is retired in early 2013 it will have outlasted the typical operating lifespan for a supercomputer by more than two years.

Through the years, IU has made significant investments in its high performance computing resources, resulting in a number of "firsts." For example, in 2001, IU's Research SP was the first university-owned supercomputer capable of 1 teraflops processing capability; in 2003, IU achieved the first distributed Linux cluster achieving more than 1 teraflops on standard benchmark applications; and in 2006 Big Red was the fastest academic supercomputer in the United States.

This partnership with Cray resulted from a thorough competitive bid process. IU and Cray expect to finalize the last details of the contract within the next few weeks, and Big Red II will use IU's high-speed Lustre file system, based on DDN storage hardware.

**About Cray Inc. -** As a global leader in supercomputing, Cray provides highly advanced supercomputers and world-class services and support to government, industry and academia. Cray technology is designed to enable scientists and engineers to achieve remarkable breakthroughs by accelerating performance, improving efficiency and extending the capabilities of their most demanding applications. Cray's Adaptive Supercomputing vision is focused on delivering innovative next-generation products that integrate diverse processing technologies into a unified architecture, allowing customers to surpass today's limitations and meeting the market's continued demand for realized performance. Go to www.cray.com for more information.

**(…Safe Harbor Statement:** This press release contains forward-looking statements within the meaning of Section 21E of the Securities Exchange Act of 1934 and Section 27A of the Securities Act of 1933, including, but not limited to, statements related to Cray's ability to finalize a contract with IU when and on the terms expected and Cray's ability to deliver the system to IU when…"

**"…About PTI:** The mission of the Indiana University Pervasive Technology Institute (PTI) is to improve the quality of life in the state of Indiana…"



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Cray Media Contact:
Nick Davis pr@cray.com (206) 701-2123

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## BETA CAE Systems S.A. www.beta-cae.gr

### BETA CAE Systems S.A.– ANSA

Is an advanced multidisciplinary CAE pre-processing tool that provides all the necessary functionality for full-model build up, from CAD data to ready-to-run solver input file, in a single integrated environment. ANSA is a full product modeler for LS-DYNA, with integrated Data Management and Process Automation. ANSA can also be directly coupled with LS-OPT of LSTC to provide an integrated solution in the field of optimization.

### BETA CAE Systems S.A.– μETA

Is a multi-purpose post-processor meeting diverging needs from various CAE disciplines. It owes its success to its impressive performance, innovative features and capabilities of interaction between animations, plots, videos, reports and other objects. It offers extensive support and handling of LS-DYNA 2D and 3D results, including those compressed with SCAI's FEMZIP software

## CRAY

www.cray.com

http://www.cray.com/Products/Products.aspx

**The Cray XK6**

The Cray XK6 supercomputer combines Cray's proven Gemini interconnect, AMD's leading multi-core scalar processors and NVIDIA's powerful many-core GPU processors to create a true, productive hybrid supercomputer

**Cray XE6™ and Cray XE6m™ Supercomputers**

The Cray XE6 scalable supercomputer is engineered to meet the demanding needs of capability-class HPC applications. The Cray XE6m is optimized to support scalable workloads in the midrange market.

**Cray XMT™ System YarcData uRiKA™ Graph Appliance**

The YarcData uRiKA graph appliance is a purpose built solution for Big Data relationship analytics. uRiKA enables enterprises to discover unknown and hidden relationships in Big Data, perform real-time analytics on Big Data graph problems, and realize rapid time to value on Big Data solutions.

The uRiKA graph appliance complements an existing data warehouse or Hadoop cluster.

**Cray Sonexion 1300™ Storage System**

The Cray Sonexion 1300 system is an integrated, high performance storage system that features next-generation modular technology to maximize the performance and capacity scaling capabilities of the Lustre file system.

Cray also offers custom and third-party storage and data management solutions

## DatapointLabs

www.datapointlabs.com

Testing over 1000 materials per year for a wide range of physical properties, DatapointLabs is a center of excellence providing global support to industries engaged in new product development and R&D.

The compary meets the material property needs of CAE/FEA analysts, with a specialized product line, TestPaks®, which allow CAE analysts to easily order material testing for the calibration of over 100 different material models.

DatapointLabs maintains a world-class testing facility with expertise in physical properties of plastics, rubber, food, ceramics, and metals.

Core competencies include mechanical, thermal and flow properties of materials with a focus on precision properties for use in product development and R&D.

Engineering Design Data including material model calibrations for CAE Research Support Services, your personal expert testing laboratory Lab Facilities gives you a glimpse of our extensive test facilities Test Catalog gets you instant quotes for over 200 physical properties.

## ETA – Engineering Technology Associates www.eta.com

**Inventium Suite™**

Inventium Suite™ is an enterprise-level CAE software solution, enabling concept to product. Inventium's first set of tools will be released soon, in the form of an advanced Pre & Post processor, called PreSys.

Inventium's unified and streamlined product architecture will provide users access to all of the suite's software tools. By design, its products will offer a high performance modeling and post-processing system, while providing a robust path for the integration of new tools and third party applications.

**PreSys**

Inventium's core FE modeling toolset. It is the successor to ETA's VPG/PrePost and FEMB products. PreSys offers an easy to use interface, with drop-down menus and toolbars, increased graphics speed and detailed graphics capabilities. These types of capabilities are combined with powerful, robust and accurate modeling functions.

**VPG**

Advanced systems analysis package. VPG delivers a unique set of tools which allow engineers to create and visualize, through its modules--structure, safety, drop test, and blast analyses.

**DYNAFORM**

Complete Die System Simulation Solution. The most accurate die analysis solution available today. Its formability simulation creates a "virtual tryout", predicting forming problems such as cracking, wrinkling, thinning and spring-back before any physical tooling is produced

## ESI Group

www.esi-group.com

**Visual-Environment:** Visual-Environment is an integrated suite of solutions which operate either concurrently or standalone within a common environment. It aims at delivering an open collaborative engineering framework. As such, it is constantly evolving to address various disciplines and available solvers.

**Visual-Crash is a dedicated environment for crash simulation:** It helps engineers get their job done in the smoothest and fastest possible way by offering an intuitive windows-based graphical interface with customizable toolbars and complete session support.

For LS-DYNA users, Visual-Crash DYNA allows to focus and rely on high quality digital models, from start to finish as it addresses the coupling with competitive finite element or rigid body based software. This very open and versatile environment simplifies the work of CAE engineers across the enterprise by facilitating collaboration and data sharing.

Further tools are integrated in Visual-Environment enhancing CAE engineers work tasks most efficiently.

**Visual-Mesh** generates 1D, 2D and 3D elements for any kind of simulation.
Visual-Mesh provides automatic and guided surfaces clean up, application specific mesh generation and intuitive post mesh editing features..

**Visual-Viewer** is a complete, productive and innovative post-processing environment for CAE applications.

Visual-Viewer delivers a dedicated plotting and animation control solution. It offers a multi page, multi plot environment, allowing to group data into pages and plots. It is designed with a Windows GUI based on an intuitive and sleek user interface.

**Visual-Process** Executive is an advanced CAE environment for process customization and automation.

**VisualDSS** is an End-to-End Decision Support System for CAE. Manufacturers widely resort to Simulation-Based Design to gain a competitive edge in product development.

## GNS - Gesellschaft für Numerische Simulation mbH www.gns-mbh.com

**Animator4**

A general finite element post-processor and holds a leading position in its field. Animator4 is used worldwide by almost all automotive companies, a great number of aerospace companies, and within the chemical industry.

**Generator2.**

A specialized pre-processor for crashworthiness applications and has become very successful in the field of passenger safety and pedestrian protection. It is mainly used as a positioning tool for finite element component models by a great number of automobile companies throughout the world.

**Indeed**

An easy-to-use, highly accurate virtual manufacturing software that specializes in the simulation of sheet metal forming processes. Indeed is part of the GNS software suite and works concurrently with all other GNS software products.

**OpenForm**

A pre- and post-processor independently of a particular finite element forming simulation package. The software is extremely easy to handle and can be used as was designed to enable those who are not finite element experts to carry out multi-stage forming simulations with even complex multi purpose finite element codes.

## Gompute on demand®/ Gridcore AB Sweden

**www.gompute.com** **www.gridcore.se**

Gompute is owned, developed and operated by Gridcore AB in Sweden. Founded in 2002, Gridcore is active in three areas: Systems Integration, Research & Development and HPC as a service.

Gridcore has wide experience of different industries and applications, developed a stable product portfolio to simplify an engineer/scientist's use of computers, and has established a large network of partners and collaborations, where we together solve the most demanding computing tasks for our customers. Gridcore has offices in Gothenburg (Sweden), Stuttgart (Germany), Durham NC (USA) and sales operations in The Netherlands and Norway.

The Gridcore developed E-Gompute software for internal HPC resources gives end users (the engineers) an easy-to-use and complete environment when using HPC resources in their daily work, and enables collaboration, advanced application integrations, remote pre/post, accounting/billing of multiple teams, license tracking, and more, accelerating our customers usage of virtual prototyping

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## JSOL Corporation

www.jsol.co.jp/english/cae/

**HYCRASH**

Easy-to-use one step solver, for Stamping-Crash Coupled Analysis. HYCRASH only requires the panels' geometry to calculate manufacturing process effect, geometry of die are not necessary. Additionally, as this is target to usage of crash/strength analysis, even forming analysis data is not needed. If only crash/strength analysis data exists and panel ids is defined. HYCRASH extract panels to calculate it's strain, thickness, and map them to the original data.

**JSTAMP/NV**

As an integrated press forming simulation system for virtual tool shop the JSTAMP/NV meets the various industrial needs from the areas of automobile, electronics, iron and steel, etc. The JSTAMP/NV gives satisfaction to engineers, reliability to products, and robustness to tool shop via the advanced technology of the JSOL Corporation.

**JMAG**

JMAG uses the latest techniques to accurately model complex geometries, material properties, and thermal and structural phenomena associated with electromagnetic fields. With its excellent analysis capabilities, JMAG assists your manufacturing process

## Livermore Software Technology Corp. www.lstc.com

**LS-DYNA**

A general-purpose finite element program capable of simulating complex real world problems. It is used by the automobile, aerospace, construction, military, manufacturing, and bioengineering industries. LS-DYNA is optimized for shared and distributed memory Unix, Linux, and Windows based, platforms, and it is fully QA'd by LSTC. The code's origins lie in highly nonlinear, transient dynamic finite element analysis using explicit time integration.

**LS-PrePost**

An advanced pre and post-processor that is delivered free with LS-DYNA. The user interface is designed to be both efficient and intuitive. LS-PrePost runs on Windows, Linux, and Macs utilizing OpenGL graphics to achieve fast rendering and XY plotting.

**LS-OPT**

LS-OPT is a standalone Design Optimization and Probabilistic Analysis package with an interface to LS-DYNA. The graphical preprocessor LS-OPTui facilitates definition of the design input and the creation of a command file while the postprocessor provides output such as approximation accuracy, optimization convergence, tradeoff curves, anthill plots and the relative importance of design variables.

**LS-TaSC**

A Topology and Shape Computation tool. Developed for engineering analysts who need to optimize structures, LS-TaSC works with both the implicit and explicit solvers of LS-DYNA. LS-TaSC handles topology optimization of large non-linear problems, involving dynamic loads and contact conditions.

**LSTC Dummy Models**

Anthropomorphic Test Devices (ATDs), as known as "crash test dummies", are life-size mannequins equipped with sensors that measure forces, moments, displacements, and accelerations.

**LSTC Barrier Models**

LSTC offers several Offset Deformable Barrier (ODB) and Movable Deformable Barrier (MDB) model

## Oasys, Ltd

www.oasys-software.com/dyna

**Oasys LS-DYNA® Environment**

The Oasys Suite of software, exclusively written for LS-DYNA®, is at the leading edge of the market and is used worldwide by many of the largest LS-DYNA® customers.

**Oasys PRIMER** is a model preparation tool that is fully compatible with the latest version of LS-DYNA®, eliminating the risk of data loss or corruption when a file is manipulated, no matter what operations are performed on it:

**Key benefits:**

- Maintains data integrity
- Finds and fixes model errors (currently over 5000 checks)
- Specialist tools for dummy positioning, seatbelt fitting, mechanisms, interior head impact etc.
- Connection manager for spotwelds, bolts, adhesive etc.
- Intelligent editing, deletion and merging of data
- Customisable with macros and JavaScript.

**Oasys D3PLOT** is a powerful 3D visualization package for post-processing LS-DYNA® analyses

**Key benefits:**

- Fast, high quality graphics
- Easy, in-depth access to all LS-DYNA® results.
- User defined data components
- Customisable with JavaScript.

**Oasys T/HIS** is an X-Y graph plotting package for LS-DYNA®

**Key benefits:**

1. Automatically reads all LS-DYNA® results.
2. Wide range of functions and injury criteria.
3. Easy handling of data from multiple models
4. Scriptable for automatic post-processing

**Oasys REPORTER** is an automatic report generation tool, for use with LS-DYNA®. which allows fast automatic report creation for analyses.

## Shanghai Hengstar

www.hengstar.com

**Center of Excellence**

Hengstar Technology is the first LS-DYNA training center of excellence in China. As part of its expanding commitment to helping CAE Engineers, Hengstar Technology will continue to organize high level training courses and seminars in 2012.

The lectures/training are taught by senior engineers and experts mainly from LSTC, Carhs, OEMs, and other consulting groups.

**On Site Training**

Hengstar also provides customer customized training programs on-site at the company facility. Training is tailored for company needs using LS-DYNA or the additional software products by LSTC.

**Distribution & Support**

Hengstar Distributes and supports LS-DYNA, LS-OPT, LS-PrePost, LS-TaSC. Hongsheng Lu, previously was directly employed by LSTC before opening his distributorship in China for LSTC software. He travels to LSTC often to keep current on the latest software features and support to continue to grow Hengstar as a CAE consulting group.

| | | | | |
|---|---|---|---|---|
| **Canada** | **Metal Forming Analysis Corp MFAC** galb@mfac.com www.mfac.com | | | |
| | LS-DYNA | LS-OPT | LS-PrePost | LS-TaSC |
| | LSTC Dummy Models | LSTC Barrier Models | eta/VPG | |
| | eta/DYNAFORM | INVENTIUM/PreSys | | |
| **United States** | **CAE Associates Inc.** info@caeai.com www.caeai.com | | | |
| | ANSYS Products | CivilFem | Consulting ANSYS | |
| | | | Consulting LS-DYNA | |
| **United States** | **DYNAMAX** sales@dynamax-inc.com www.dynamax-inc.com | | | |
| | LS-DYNA | LS-OPT | LS-PrePost | LS-TaSC |
| | LSTC Dummy Models | | LSTC Barrier Models | |

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| **United States** | **ESI-Group N.A** www.esi-group.com | | | |
| | QuikCAST | SYSWELD | PAM-RTM | PAM-CEM |
| | VA One | CFD-ACE+ | ProCAST | Visual-Process |
| | VisualDSS | Weld Planner | Visual-Environment | IC.IDO |
| **United States** | **Engineering Technology Associates – ETA** www.eta.com | | sales@eta.com | |
| | INVENTIUM/PreSy | NISA | VPG | LS-DYNA |
| | LS-OPT | DYNAform | | |
| **United States** | **Gompute** www.gompute.com | | info@gompute.com | |
| | LS-DYNA Cloud Service | | Additional software | |
| | Additional Services | | | |

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|---|---|---|---|---|
| **United States** | **Livermore Software Technology Corp** | | sales@lstc.com | |
| | **LSTC** www.lstc.com | | | |
| | LS-DYNA | LS-OPT | LS-PrePost | LS-TaSC |
| | LSTC Dummy Models | LSTC Barrier Models | TOYOTA THUMS | |

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|---|---|---|---|---|
| **United States** | **Predictive Engineering** www.predictiveengineering.com | | george.laird@predictiveengineering.com | |
| | FEMAP | NX Nastran | LS-DYNA | LS-OPT |
| | LS-PrePost | LS-TaSC | LSTC Dummy Models | |
| | | | LSTC Barrier Models | |

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|---|---|---|---|---|
| **France** | **DynAS+** | | v.lapoujade@dynasplus.com | |
| | www.dynasplus.com | | | |
| | LS-DYNA | LS-OPT | LS-PrePost | LS-TaSC |
| | DYNAFORM | VPG | MEDINA | |
| | LSTC Dummy Models | | LSTC Barrier Models | |
| **France** | **ALYOTECH** | | nima.edjtemai@alyotech.fr | |
| | www.alyotech.fr | | | |
| | ANSYS | LS-DYNA | MOLDEX3D | FEMZIP |
| | Primer | PreSys | DYNAFORM | SKYGEN |
| | MERCUDA | MOCEM | | |
| **Germany** | **CADFEM GmbH** | | lsdyna@cadfem.de | |
| | www.cadfem.de | | | |
| | ANSYS | LS-DYNA | optiSLang | DIGIMAT |
| | ESAComp | AnyBody | VPS | |
| | FTI FormingSuite | | | |

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|---|---|---|---|---|
| **Germany** | **DYNAmore GmbH** | | uli.franz@dynamore.de | |
| | www.dynamore.de | | | |
| | PRIMER | LS-DYNA | FTSS | VisualDoc |
| | LS-OPT | LS-PrePost | LS-TaSC | DYNAFORM |
| | Primer | FEMZIP | GENESIS | |
| | TOYOTA THUMS | | LSTC Dummy & Barrier Models | |
| **Germany** | **GNS** | | mbox@gns-mbh.com | |
| | www.gns-mbh.com | | | |
| | Animator | Generator | Indeed | OpenForm |
| **Netherland** | **Infinte** | | j.mathijssen@infinite.nl | |
| | www.infinite.nl | | | |
| | ANSYS Products | CivilFem | CFX | Fluent |
| | LS-DYNA | LS-PrePost | LS-OPT | LS-TaSC |

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|---|---|---|---|---|
| **Italy** | **EnginSoft SpA** | | info@enginsoft.it | |
| | www.enginsoft.it | | | |
| | ANSYS | MAGMA | Flowmaster | FORGE |
| | CADfix | LS-DYNA | Dynaform | Sculptor |
| | ESAComp | AnyBody | FTI Software | |
| | AdvantEdge | Straus7 | LMS Virtual.Lab | ModeFRONTIER |
| **Russia** | **STRELA** | | info@dynarussia.com | |
| | LS-DYNA | LS-TaSC | LS-OPT | LS-PrePost |
| | LSTC Dummy Models | | LSTC Barrier Models | |
| **Sweden** | **DYNAmore Nordic** | | marcus.redhe@dynamore.se | |
| | www.dynamore.se | | | |
| | ANSA | µETA | LS-DYNA | LS-OPT |
| | LS-PrePost | LS-TaSC | FastFORM | DYNAform |
| | FormingSuite | | LSTC Dummy Models | |
| | | | LSTC Barrier Models | |
| **Sweden** | **GRIDCORE** | | info@gridcore.com | |
| | www.gridcore.se | | | |
| | LS-DYNA Cloud Service | | Additional software | |

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|---|---|---|---|---|
| **Switzerland** | **DYNAmoreSwiss GmbH** | | info@dynamore.ch | |
| | www.dynamore.ch | | | |
| | LS-DYNA | | LS-OPT | LS-PrePost |
| | LS-TaSC | | LSTC Dummy Models | |
| | | | LSTC Barrier Models | |
| **UK** | **Ove Arup & Partners** | | dyna.sales@arup.com | |
| | www.oasys-software.com/dyna | | | |
| | LS-DYNA | | LS-OPT | LS-PrePost |
| | LS-TaSC | PRIMER | D3PLOT | T/HIS |
| | REPORTER | SHELL | FEMZIP | HYCRASH |
| | DIGIMAT | Simpleware | LSTC Dummy Models | |
| | | | LSTC Barrier Models | |

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| **Australia** | **LEAP** | | | |
| | www.leapaust.com.au | | | |
| | ANSYS Mechanical | ANSYS CFD | ANSYS EKM | Recurdyn |
| | ANSYS DesignXplorer | ANSYS HPC | FlowMaster | Ensigh |
| | LS DYNA | DYNAform | Moldex 3D | FE-Safe |
| **China** | **ETA – China** | | lma@eta.com.cn | |
| | www.eta.com/cn | | | |
| | Inventium | VPG | DYNAFORM | NISA |
| | LS-DYNA | LS-OPT | LSTC Dummy Models | LS-PrePost |
| | | | LSTC Barrier Models | LS-TaSC |
| **China** | **Oasys Ltd. China** | | Stephen.zhao@arup.com | |
| | www.oasys-software.com/dyna | | | |
| | PRIMER D3PLOT | HYCRASH | T/HIS REPORTER | SHELL |
| | LS-DYNA | LS-OPT | LSTC Dummy Models | LS-PrePost |
| | DIGIMAT | FEMZIP | LSTC Barrier Models | LS-TaSC |
| **China** | **Shanghai Hengstar Technology** | | info@hengstar.com | |
| | www.hengstar.com | | | |
| | LS-DYNA | LS-TaSC | LSTC Barrier Models | |
| | LS-DYNA Courses | LS-OPT | LSTC Dummy Models | LS-PrePost |

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|---|---|---|---|---|
| **India** | **Oasys Ltd. India** | | lavendra.singh@arup.com | |
| | www.oasys-software.com/dyna | | | |
| | PRIMER D3PLOT | T/HIS | | |
| | | LS-OPT | LSTC Dummy Models | LS-PrePost |
| | | LS-DYNA | LSTC Barrier Models | LS-TaSC |

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| **India** | **EASI Engineering** | | rvenkate@easi.com | |
| | www.easi.com | | | |
| | ANSA | | | |
| | LS-DYNA | LS-OPT | LSTC Dummy Models | LS-PrePost |
| | | | LSTC Barrier Models | LS-TaSC |

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| **India** | **CADFEM Eng. Svce** | | info@cadfem.in | |
| | www.cadfem.in | | | |
| | ANSYS VPS | optiSLang | ESAComp | DIGIMAT |
| | LS-DYNA | LS-OPT | LSTC Dummy Models | LS-PrePost |
| | FTI FormingSuite | AnyBody | LSTC Barrier Models | LS-TaSC |

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|---|---|---|---|---|
| **India** | **Kaizenat Technologies Pvt. Ltd** | | support@kaizenat.com | |
| | http://kaizenat.com / | | | |
| | LS-DYNA | LS-OPT | LSTC Dummy Models | LS-PrePost |
| | Dedicated to LSTC Software | | LSTC Barrier Models | LS-TaSC |

| Distribution & Consulting | Asia Pacific | Distribution & Consulting |
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Japan **ITOCHU** LS-dyna@ctc-g.co.jp

www.engineering-eye.com

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| LS-DYNA | LS-OPT | LS-PrePost | LS-TaSC |
| LSTC Dummy Models | LSTC Barrier Models | CmWAVE | |

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Japan **JSOL**

www.jsol.co.jp/english/cae

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| JSTAMP | HYCRASH | JMAG | |
| LS-DYNA | LS-OPT | LS-PrePost | LS-TaSC |
| LSTC Dummy Models | LSTC Barrier Models | TOYOTA THUMS | |

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Japan **FUJITSU**

http://jp.fujitsu.com/solutions/hpc/app/lsdyna

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| LS-DYNA | LS-OPT | LS-PrePost | LS-TaSC |
| LSTC Dummy Models | LSTC Barrier Models | CLOUD Services | |

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|---|---|---|---|---|
| Korea | **THEME** | wschung@kornet.com | | |
| | www.lsdyna.co.kr | | | |
| | LS-DYNA | LS-OPT | LS-PrePost | LS-TaSC |
| | LSTC Dummy Models | LSTC Barrier Models | eta/VPG | Planets |
| | eta/DYNAFORM | FormingSuite | Simblow | TrueGRID |
| | JSTAMP/NV | Scan IP | Scan FE | Scan CAD |
| | FEMZIP | | | |

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|---|---|---|---|---|
| Korea | **KOSTECH** | young@kostech.co.kr | | |
| | www.kostech.co.kr | | | |
| | LS-DYNA | LS-OPT | LS-PrePost | LS-TaSC |
| | LSTC Dummy Models | LSTC Barrier Models | eta/VPG | FCM |
| | eta/DYNAFORM | DIGIMAT | Simuform | Simpack |
| | AxStream | TrueGrid | FEMZIP | |

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|---|---|---|---|---|
| Taiwan | **Flotrend** | gary@flotrend.tw | | |
| | www.flotrend.com.tw | | | |
| | LS-DYNA | LS-OPT | LS-PrePost | LS-TaSC |
| | LSTC Dummy Models | LSTC Barrier Models | eta/VPG | FCM |

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| Taiwan | **APIC** | | | |
| | www.apic.com.tw | | | |
| | LS-DYNA | LS-OPT | LS-PrePost | LS-TaSC |
| | LSTC Dummy Models | LSTC Barrier Models | eta/VPG | FCM |

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| Cloud Service | LS-DYNA | Cloud Services |
|---|---|---|
| Germany | Gridcore www.gridcore.se | |
| Sweden | Gridcore www.gridcore.se | |
| United States | Gompute www.gompute.com | |

The Complete Courses Offered Can Be Found At: www.cadfem.de

Please check the site for accuracy and changes.
Among the many course offered:

Introduction to explicit structural mechanics with ANSYS-LS-DYNA and LSTC's LS-DYNA

11/06/12 12/19/12

Contact modeling with LS-DYNA

11/06/12

Introduction to simulation with Diffpack

11/06/12

Working efficiently with Diffpack in ANSYS Workbench

11/07/12

Additional Courses are offered – please check the website for upcoming dates for: FTI Forming Suite - DIGIMAT
DIFFPACK and others.

Individual Training: Take advantage of the expertise of our specialists and get to know how simulation processes in your company can be arranged in an optimal way.

The Complete Courses Offered Can Be Found At: www.dynamore.de/en

Intro LS-DYNA
09/20/12 10/15/12 10/30/12 12/10/12

Contact Definitions
10/18/12

Plasticity
10/24/12

Users Interfaces
11/19/12

Crash Analysis
12/04/12

ALE
10/11/12

Meshless Methods
10/11/12

The Complete Courses Offered Can Be Found At: www.lstc.com

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| Introduction to LS-OPT | MI | November 6-9, 2012 |
| Introduction to LS-PrePost (no charge) | CA | November 12, 2012 |
| Introduction to LS-DYNA | CA | November 13-16, 2012 |
| Introduction to LS-PrePost (no charge) | MI | December 10, 2012 |
| Introduction to LS-DYNA | MI | December 11-14, 2012 |
| Advanced Options in LS-DYNA | MI | December 17-18, 2012 |

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| January 21-22, 2013 | Implicit Analysis with LS-DYNA | MI |
| January 28, 2013 | Introduction to LS-PrePost (no charge) | CA |
| Jan. 29 - Feb. 1, 2013 | Introduction to LS-DYNA | CA |
| February 25-27, 2013 | ALE/EULERIAN & Fluid/Structure Interaction in LS-DYNA | CA |
| February 28-March 1, 2013 | Smoothed Particle Hydrodynamics (SPH) in LS-DYNA | CA |
| March 14-15, 2013 | Blast & Penetration | MI |
| March 18, 2013 | Introduction to LS-PrePost (no charge) | MI |
| March 19-22, 2013 | Introduction to LS-DYNA | MI |
| March 19-20, 2013 | Advanced Options in LS-DYNA | CA |
| March 21-22, 2013 | Contact in LS-DYNA | CA |

The Complete Courses Offered Can Be Found At: www.dynamore.se

Please check the site for accuracy and changes.
Among the many course offering are the following:

LS-PrePost 3, introduction
November 26

LS-DYNA, introductory course
November 27

LS-DYNA, implicit analysis
October 2

ANSA & Metapost, introductory course
October 9

Contacts in LS-DYNA
October 12

LS-DYNA, simulation of sheet metal forming processes
October 16

LS-DYNA, advanced training class in impact analysis
November 20

The complete Training Courses offered can be found at www.dynasplus.com

Please check the site for accuracy and changes.

LS-DYNA Unified Introduction Implicit & Explicit Solver
16-19/01, 18-21/06 & 12-15/11

Switch from Ls-PrePost 2.X to 3.X
28/11

LS-DYNA SPH
21-22/05 & 8-9/10
-material modeling
14-15/12

LS-PrePost 3.0 – Advanced meshing capabilities
5/04 & 27/09 & 29/11

LS-DYNA – Plasticity, Damage & Failure – By Paul DU BOIS
26-27/11
(date may be changed in Q1)

LS-DYNA – Polymeric materials – By Paul DU BOIS
12-13/12

**Users LS-DYNA Days**

Alyotech will be hosting two Users Days this year. These events will focus on the recent evolutions of LS-DYNA and related products from LSTC and will feature talks both about novel functions and real-world applications.

Two sessions will be held: the first one will take place in Toulouse on September 20th while the second one will be held in Antony on November 8th.

Each session will start with lectures from Alyotech and presentations of studies from LS-DYNA users in the morning. The afternoon will then be devoted to discussions between users on selected topics of interest.

Don’t hesitate to contact us at support.ls-dyna@alyotech.fr

**Engineering Technology Associates**

The Complete Courses Offered Can Be Found At: www.eta.com

Please check the site for accuracy and changes.

Among the many course offering are the following:

**Introduction to DYNAFORM**

November 6th

December 4th

**Introduction to PreSys**

November 13th

December 11th

**Introduction to LS-DYNA**

November 20th

December 18th

The Complete Courses Offered Can Be Found At: www.caeai.com

Please check the site for accuracy and changes. Among the many course ffering are the following:

ANSYS Training, CFD and FEA Consultants Serving CT, NJ, NY, MA, NH , VT

Partial Listing

Nov 01, 2012
Assembly Modeling – eLearning / Online

Nov 05, 2012
Introduction to ANSYS Mechanical APDL Part I

Nov 08, 2012
Introduction to ANSYS Mechanical APDL Part II

Nov 13, 2012
Mechanically Fastened Joints and Bolt Preload - e-Learning / Online

Nov 15, 2012
Mechanically Fastened Joints and Bolt Preload - e-Learning / Online

Dec 03, 2012
ANSYS DesignModeler

Dec 04, 2012
Introduction to ANSYS Mechanical (Workbench) /

The Complete Courses Offered Can Be Found at http://www.hengstar.com

| 2012 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| An Introduction to LS-DYNA(High Level) | | | | | | | | | | | |
| Concrete & Geomaterial Modeling with LS-DYNA | | | | | | | | | | | |
| Pedestrian Safety and Bonnet Design with LS-DYNA | | | | | | | | | | | |
| Crashworthiness Theory and Technology | | | | | | | | | | | |
| LS-DYNA MPP, Airbag Simulation with LS-DYNA | | | | | | | | | | | |
| Introduction of LS-OPT which is Based on LS-DYNA | | | | | | | | | | | |
| Passive Safety and Restraint Systems Design | | | | | | | | | | | |
| Crashworthiness Simulation with LS-DYNA | | | | | | | | | | | |
| Passive Safety Simulation with LS-DYNA | | | | | | | | | | | |
| Crashworthy Car Body Development - Design, Simulation and Optimization | | | | | | | | | | | |

For course location visit www.alyotech.fr

LS-DYNA Introduction

Nov 12-14
Dec 03-05

LS-DYNA Implicit

Nov 19-21

LS-PrePost – Meshing

Nov 26

LS-PrePost – New Interface

Nov 27

LS-OPT Introduction

Dec 10-11

LS-TaSC – Topology Optimization

Dec 12

**9th European LS-DYNA Users' Conference**

Location: Manchester Central Convention Complex,
Manchester, UK

Welcome Reception and Social Event:
Sunday 2nd June 2013

Conference:
Monday 3rd and Tuesday 4th June 2013

Gala Dinner:
Monday 3rd June 2013

Arup are pleased to announce that the 9th European LS-DYNA Users' Conference will be held at Manchester Central Convention Complex, UK on 3rd and 4th June 2013.

Manchester is situated in the centre of the UK with one of the world's best connected international airports and efficient road and rail links. The event will give those in academia and industry a chance to present their work to colleagues and to catch up on the latest developments in the software. Attendees can also meet with exhibitors to find out more about hardware, software and services relating to LS-DYNA.

On the evening of Monday 3rd June the Gala Dinner will take place at the Museum of Science and Industry, just a short walk from the conference venue. The museum brings to life innovation and invention from science and industry through the ages even offering rides on 'Planet', a reproduction steam locomotive!

**Important dates:**

Registration Opens: end of September 2012
Abstract Deadline: end of December 2012
Papers Deadline: end of April 2013

If you would like to attend, present, exhibit or sponsor, please visit our conference website at: http://arup.cvent.com/euroconference.

We look forward to welcoming you to the event!

By: Dr. Nielen Stander, LSTC

**10th World Congress on Structural and Multidisciplinary Optimization**
**May 19-24, 2013, Orlando, Florida, USA**

**Session Announcement:**
**"Optimization in Nonlinear Dynamics"**
**Organized by:**
**Dr. Nielen Stander**
**LSTC**
**held at 10th World Congress on Structural and Multidisciplinary Optimization**

"I am organizing a session on "Optimization in Nonlinear Dynamics" at the next conference of the *International Society for Structural and Multidisciplinary Optimization* (WCSMO10). As a user of LS-DYNA, I would like to invite you to submit an abstract to this session. In order for me to provide early feedback, interested participants may submit their abstracts to nielen@lstc.com a week or two prior to the deadline." Nielen Stander

**Contributions for this session may include:**

- Crashworthiness Optimization
- Optimization in Fluid Dynamics
- Optimization in Reactive Flow
- Optimization in Electromagnetics
- Optimization in Fluid-Structure Interaction
- Optimization using LS-DYNA
- Parameter Identification of Nonlinear Materials
- Topology Optimization in Nonlinear Dynamics

The 500 words abstract submission deadline is January 15, 2013

***Final abstracts must be submitted, directly through the conference website, by January 15, 2013.***

General information about the conference can be found on the conference web site http://conferences.dce.ufl.edu/wcsmo-10 .

Nielen Stander
(nielen@lstc.com)

 **FACEBOOK**

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## LINKEDIN

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## YOUTUBE

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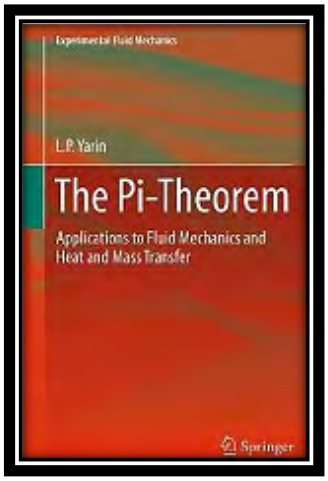
## NEWS FEEDS

http://www.eta.com/index.php/eta-news?format=feed&type=rss




The Pi-Theorem: Applications to Fluid Mechanics and Heat and Mass Transfer (Experimental Fluid Mechanics)

Product Details
Hardcover: 330 pages
Publisher: Springer; 2012 edition (January 21, 2012)
Language: English
ISBN-10: 3642195644 ISBN-13: 978-3642195648
Product Dimensions: 6.1 x 0.9 x 9.2 inches
Shipping Weight: 1.4 pounds

**Book Description**

This volume presents applications of the Pi-Theorem to fluid mechanics and heat and mass transfer. The Pi-theorem yields a physical motivation behind many flow processes and therefore it constitutes a valuable tool for the intelligent planning of experiments in fluids. After a short introduction to the underlying differential equations and their treatments, the author presents many novel approaches how to use the Pi-theorem to understand fluid mechanical issues. The book is a great value to the fluid mechanics community, as it cuts across many subdisciplines of experimental fluid mechanics.

**From the Back Cover**

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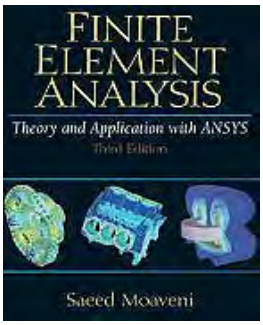



Finite Element Analysis Theory and Application with ANSYS (3rd Edition)

**Saeed Moaveni**


Practical Stress Analysis with Finite Element

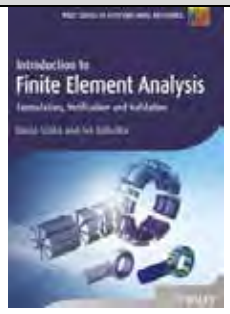
**Bryan J Mac Donald**


A First Course in the Finite Element Method

**Daryl L. Logan**

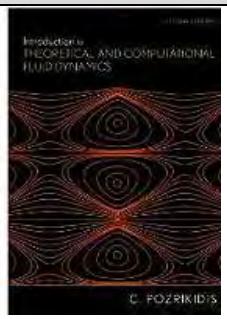

Finite Element Modelling Techniques in MSC.NASTRAN and LS/DYNA

**Sreejit Raghu**



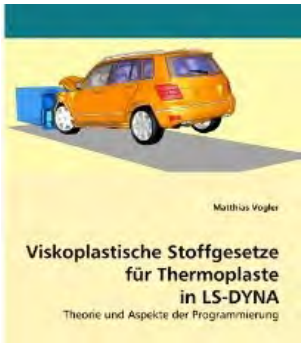

Finite Element Analysis/formulation & verification

**B. A. Szabo**



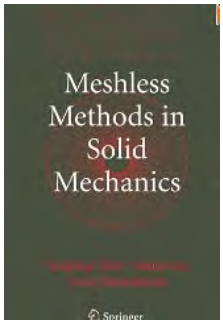

Introduction to Theoretical and Computational Fluid Dynamics

**C. Pozrikidis**



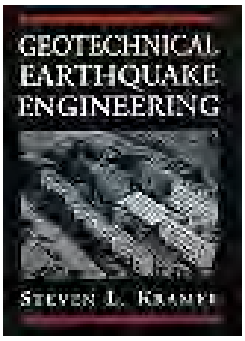

[Viskoplastische Stoffgesetze für Thermoplaste in LS-DYNA: Theorie und Aspekte der Programmierung]

**Matthias Vogler**




[Meshless Methods in Solid Mechanics]

**Youping Chen**




[Geotechnical Earthquake Engineering]

**Steven Lawrence Kramer**

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[Biomechanical Systems Technology: Computational Methods]

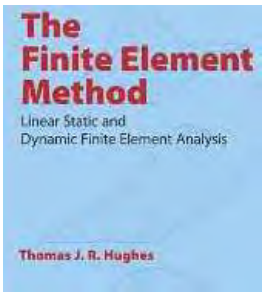
**Cornelius T. Leondes**

[Numerical response of steel reinforced concrete slab subjected to blast and pressure loadings in LS-DYNA.]

**Vivek Reddy**

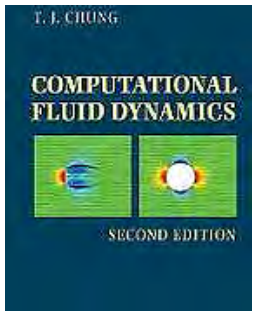

[Formulas for Mechanical and Structural Shock and Impact]

**Gregory Szuladziniski**



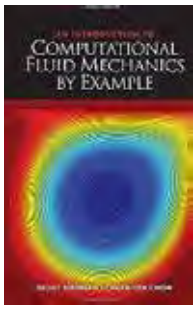

[The Finite Element Method]

**Thomas J. R. Hughes**




[Computational Fluid Dynamics]

**T. J. Chung**




[An Introduction to Computational Fluid Mechanics by Example]

**Sedat Biringen**

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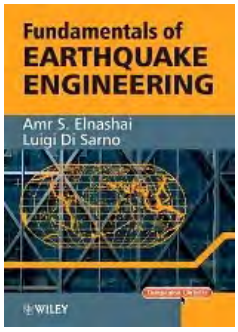
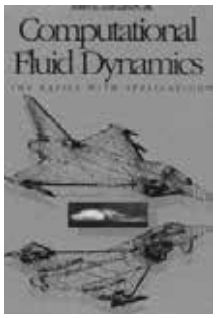


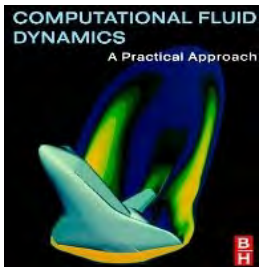

[Fundamentals of Earthquake Engineering]

**Amr S. Elnashai**




[Computational Fluid Dynamics]

**John David Anderson**




[Computational Fluid Dynamics: A Practical Approach [Paperback]]

**Guan Heng Yeoh**

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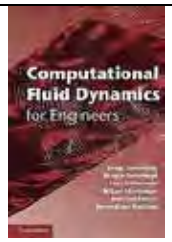
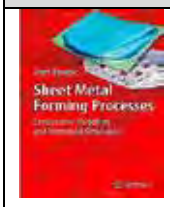
|  |  |  |  |
| Theories, Methods… <br><br> Ping Hu, Ning Ma, … | CFD for Engineers | CAE design and sheet metal forming… <br><br> Li Fei Zhou Deng | Applied Metal Forming |
|  | | | |
| Micro Metal Forming (Lecture Notes in Production Engineering) | | | |

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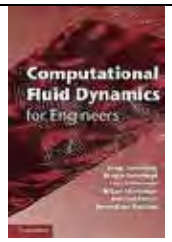
|  |  |  |  |
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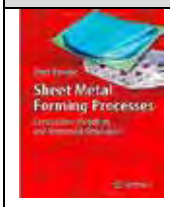
|  | | | |
| Micro Metal Forming (Lecture Notes in Production Engineering) | | | |