



GPU-ACCELERATED APPLICATIONS

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Computational Finance

APPLICATION	DESCRIPTION	SUPPORTED FEATURES	MULTI-GPU SUPPORT
Aon Benfield Pathwise™	Specialized platform for real-time hedging, valuation, pricing and risk management	Spreadsheet-like modeling interfaces, Python-based scripting environment and Grid middleware	Yes
Altimesh's Hybridizer C#	Multi-target C# framework for data parallel computing.	C# with translation to GPU or Multi-Core Xeon	Yes
Elsen Accelerated Computing Engine (TM)	Secure, accessible, and accelerated back-testing, scenario analysis, risk analytics and real-time trading designed for easy integration and rapid development.	Web-like API with Native bindings for Python, R, Scala, C. Custom models and data streams are easy to add	Yes
Global Valuation Esther	In-memory risk analytics system for OTC portfolios with a particular focus on XVA metrics and balance sheet simulations.	High quality models not admitting closed form solutions, efficient solvers based on full matrix linear algebra powered by GPUs and Monte Carlo algorithms.	Yes
Hanweck Associates	Real-time options analytical engine (Volera)	Real-time options analytics engine	Yes
MiAccLib 2.0.1	Accelerated libraries which encompasses high speed multi-algorithm search engines, data security engine and also video analytics engines for text processing, encryption/decryption and video surveillance respectively.	Text Processing : Exact Match, Approximate\Similarity Text, Wild Card, MultiKeyword and MultiColumnMultiKeyword, etc Data Security: Accelerated Encryption/Description for AES-128 Vide Analytics: Accelerated Intrusion Detection Algorithm	Yes
MISYS Global Risk	Regulatory compliance and enterprise wide risk transparency package	Risk analytics	Yes
Murex MACS Analytics Library	Analytics library for modeling valuation and risk for derivatives across multiple asset classes	Market standard models for all asset classes paired with the most efficient resolution methods (Monte Carlo simulations and Partial Differential Equations)	Yes
Numerical Algorithms Group (NAG)	Random number generators, Brownian bridges, and PDE solvers	Monte Carlo and PDE solvers	Single only
QuantAlea's Alea.cuBase F#	F# package enabling a growing set of F# capability to run on a GPU	F# for GPU accelerators	Yes
RMS	Catastrophic risk modeling for FSI (earthquakes, hurricanes, terrorism, infectious diseases)	Risk analytics	Yes
SciComp, Inc	Derivative pricing (SciFinance)	Monte Carlo and PDE pricing models	Single only
SunGard- Adaptive Analytics	A flexible and extensible engine for fast calculations of a wide variety of pricing and risk measures on a broad range of asset classes and derivatives.	Existing models code in C# supported transparently, with minimal code changes, Supports multiple backends including CUDA and OpenCL, Switches transparently between multiple GPUs and CPUS depending on the deal support and load factors.	Yes
Synerscope- Synerscope Data Visualization	Visual big data exploration and insight tools	Graphical exploration of large network datasets including geo-spatial and temporal components.	Single only
Tanay ZX Lib (Fuzzy Logic)	Financial analytics and data mining library	Monte Carlo simulations, pricing of vanilla and exotic options, fixed income analytics, data mining.	Yes
Xcelerit SDK	Software Development Kit (SDK) to boost the performance of Financial applications (e.g. Monte-Carlo, Finite-difference) with minimum changes to existing code.	C++ programming language, cross-platform (back-end generates CUDA and optimized CPU code), supports Windows and Linux operating systems.	Yes

Climate, Weather and Ocean Modeling

APPLICATION	DESCRIPTION	SUPPORTED FEATURES	MULTI-GPU SUPPORT
* ACME-Atmosphere	Global atmospheric model	Dynamics only	Yes
* COSMO	Regional numerical weather prediction and climate model	Radiation only	Yes

Data Science & Analytics

APPLICATION	DESCRIPTION	SUPPORTED FEATURES	MULTI-GPU SUPPORT
BIDMach - UC Berkeley	Fastest Big Data tools on the web. Holds the records for many common machine learning problems, on single nodes or clusters. Interactive environment for easily building and deploying machine learning models.	Scala interface. Supports linear regression, logistic regression, SVM, LDA, K-Means and other operations.	Yes
Blazegraph GPU	First and fastest GPU accelerated platform for graph query. It provides drop-in acceleration for existing RDF/Spqrql and Tinkerpop/ Blueprints graph applications. It provides high-level graph database APIs with transparent GPU acceleration for graph query.	GPU-accelerated SPARQL graph query, Data Management using the RDF interchange model, Tinkerpop/Blueprints Graph Support, Billions of edges on a single multi-GPU node, SaaS and Appliance models available.	Yes
Blazegraph DASL	It marries the power and speed of CUDA. It delivers graph analytics at over 32 billion traversed edges per second and easily integrates with Spark and other data management platforms.	Scala-based graph analytic and machine learning application language, Ease of integration into Spark and Hadoop data ecosystems, Support for GPU cluster deployment.	Yes
GPUdb	A distributed database for many core devices. GPUdb is a scalable, distributed database with SQL-style query capability for Big Data. Full suite of geospatial calculation capability.	Query against Big Data in real time. No pre-indexing allows for complex, ad-hoc query chains. Interactively explore large, streaming data sets.	Yes
* Gunrock	Gunrock is a library for graph processing on the GPU. Gunrock achieves a balance between performance and expressiveness by coupling high performance GPU implementations with a high-level programming model, that requires minimal GPU programming knowledge.	Direction-optimizing BFS, SSSP, PageRank, Connected Components, Betweenness-centrality	Yes
Jedox	Helps with portfolio analysis, management consolidation, liquidity controlling, cash flow statements, profit center accounting, treasury management, customer value analysis and many more applications, all accessible in a powerful web and mobile application or Excel environment.	This database holds all relevant data in GPU memory and is thus an ideal application to utilize the Tesla K40's 12 GB on-board RAM. Scale that up with multiple GPUs and keep close to 100 GB of compressed data in GPU memory on a single server system for fast analysis, reporting and planning.	Yes
MapD	MapD is GPU-powered big data analytics and visualization platform that is hundreds of times faster than CPU in-memory systems.	MapD uses GPUs to execute SQL queries on multi-billion row datasets and optionally render the results, all in milliseconds.	Yes
* Sqream DB	GPU accelerated SQL database engine for big data analytics. Sqream speeds SQL analytics by 100X by translating SQL queries into highly parallel algorithms run on the GPU.	Up to 100TB of raw data can be stored and queried in a standard 2U server. Inserts and analyzes hundreds of billions of records in seconds. No indexes required. No changes to SQL code or data science paradigms required.	Yes

Defense and Intelligence

APPLICATION	DESCRIPTION	SUPPORTED FEATURES	MULTI-GPU SUPPORT
Comprimato JPEG2000 Codec	A high performing, GPU powered, JPEG2000 encoder and decoder SDK which can be integrated into almost any application.	Very large image processing, specific area decoding, multi resolution/quality decoding supporting all GEOSPATIAL image formats. (eg NITF, BIIF). Mobile and embedded platform friendly.	Yes
DigitalGlobe - Advanced Ortho Series	Geospatial visualization	Image orthorectification	Yes
Elcomsoft	High-performance distributed password recovery software with NVIDIA GPU acceleration and scalability to over 10,000 workstations.	GPU acceleration for password recovery, 10-100x speedup for password recovery.	Yes
Esri ArcGIS for Desktop (ArcMap and ArcGIS Pro) – Spatial Analyst and 3D Analyst	Determines the raster surface locations visible to a set of observer features, using geodesic methods.	Viewshed2 transforms the elevation surface into a geocentric 3D coordinate system and runs 3D sightlines to each transformed cell center.	Yes
Eternix - Blaze Terra	Geospatial visualization	3D visualization of geospatial data	Yes
GeoWeb3d Desktop	Geospatial visualization	3D visualization of geospatial data	Yes
GPUdb	Multi-GPU, Multi-Machine distributed object store providing SQL style query capability, advanced geospatial query capability, heatmap generation, and distributed rasterization services.	Query against big data in real time. No pre-indexing allows for complex, ad-hoc query chains. Interactively explore large, streaming data sets.	Yes
Harris ENVI	Image Processing and Analytics	Image orthorectification, Image transformation, atmospheric correction, Panchromatic co-occurrence texture filter	Yes
* Herta Security - BioSurveillance NEXT, BioFinder	Real time facial recognition and forensic alerts against multiple watchlists.	Supports crowded scenes, difficult lighting, faster than real-time analysis, partial face concealment.	Yes
Intergraph Motion Video Analyst	Video filters and mosaic'ing - Geo-fuses FMV analytics with intelligence data.	Full motion video ortho mosaic processing, de-hazing algorithms.	Single only
Intuvision Panoptes 3.0	Video analytics	Object recognition and change detection	Yes
LuciadLightspeed	Geospatial visualization and analysis	Geospatial situational awareness	Single only
Manifold Systems	Full-featured GIS, vector/raster processing & analysis	Manifold surface tools	Yes
MotionDSP - Ikena ISR	Real-time full motion video (FMV) and wide-area motion imagery (WAMI) enhancement and computer-vision-based analytics software for intelligence analysts	Real-time super-resolution-based video enhancement on live streams, geospatial visualization, target detection and tracking, and fast 2-D mapping	Yes
NerVve Visual Search Solution (NVSS)	Video/Image Live and Forensic Search	Video and image content search	Yes
OpCoast SNEAK	Electromagnetic signals propagation modeling for complex urban and terrain environments.	Ray tracing, DTED and remote sensing inputs.	Yes
PCI Geomatics GXL	Image processing	Image orthorectification and additional image processing	Yes
Skyline Software - Terrabuilder PhotoMesh	PhotoMesh integrates a GPU-based, fast algorithm, able to automatically build 3D models from simple photographs. PhotoMesh revolutionizes the use of geospatial data by fully automating the generation of high-resolution, textured, 3D mesh models from standard 2D images.	3D model building from imagery; building texture generation.	Yes

SocetGXP - BAE Systems	The Automatic Spatial Modeler (ASM) is designed to generate 3-D point clouds with accuracy similar to LiDAR, which can extract 3-D objects from stereo images. ASM can extract dense 3-D point clouds from stereo images, and extract accurate building edges and corners from stereo images with high resolution, large overlaps, and high dynamic range.	Automated 3D feature extraction	Yes
SynerScope	Big data visualization and data discovery, for combining Analytics on Analytics with IoT compute-at-the-edge smart sensors.	Real-time Interaction with data	Single only

Deep Learning and Machine Learning

APPLICATION	DESCRIPTION	SUPPORTED FEATURES	MULTI-GPU SUPPORT
* BidMach	GPU-accelerated classical machine learning library	Logistic regression, SVM, LDA, SFA, NMF, ICA, random forests, clustering, word2vec	Yes
Caffe	The Caffe deep learning framework makes implementing state-of-the-art deep learning easy.	Process over 40M images per day with a single NVIDIA K40 or Titan GPU.	Single only
Caffe* Parallel	This is a faster framework for deep learning, it's forked from BVLC/caffe (master branch). This allows data-parallel via MPI.	Using the GPU cluster processing mass image data	Yes
Clarifai	Clarifai brings a new level of understanding to visual content through deep learning technologies. Clarifai uses GPUs to train large neural networks to solve practical problems in advertising, media, and search across a wide variety of industries.	GPU-based training and inference. Recognizes and indexes images with predefined classifiers, or with custom classifiers.	Yes
Chainer	DL framework that makes the construction of neural networks (NN) flexible and intuitive.	Dynamic NN construction, which makes debugging easier. CPU/GPU-agnostic coding, which is promoted by CuPy, partially NumPy-compatible multidimensional array library for CUDA. Data-dependent NN construction, which fully exploits the control flows of Python without magic.	Yes
* CNTK	Microsoft's Computational Network Toolkit (CNTK) is a unified computational network framework that describes deep neural networks as a series of computational steps via a directed graph.	Supports many applications, including Speech Recognition, Machine Translation, Image Recognition, Image Captioning, Text Processing and Relevance, Language Understanding, Language Modeling	Yes
Deeplearning4j	Deeplearning4j is the most popular deep learning framework for the JVM, and includes all major neural nets such as convolutional, recurrent (LSTMs) and feedforward.	Integrates with Hadoop and Spark to run distributed. Java and Scala APIs. Composable framework that facilitates building your own nets. Includes ND4J, the Numpy for Java.	Yes
Dextro	Dextro's API uses deep learning systems to analyze and categorize videos in real-time.	Object and scene detection, Machine transcription for audio Motion and movement detection.	Yes
* IntelligentVoice	Far more than a transcription tool, this speech recognition software learns what is important in a telephone call, extracts information and stores a visual representation of phone calls to be combined with text/instant messaging and E-mail. Intelligent Voice's search and alert makes it possible to tackle issues before they arise, address data security concerns and monitor physical access to data.	Advanced Speech Recognition across large data sets, JumpTo Technology, for data visualisation, E-Discovery, extraction from phone calls, IM & Email defining key phrases and emotional analysis. Compliance, defining key conversations and interactions	Yes

Labellio	The world's easiest deep learning web service for computer vision, which allows everyone to build own image classifier with only web browser.	Neural net fine-tuning for image data, data crawling, data browsing as well as drag-and-drop style data cleansing backed by AI support.	Yes
* MatConvNet	CNNs for MathWorks MATLAB, allows you to use MATLAB GPU support natively rather than writing your own CUDA code	Building Blocks, Simple CNN wrapper, DagNN wrapper, cuDNN implemented	Yes
MetaMind	Provides a deep learning API for image recognition and text sentiment analysis. Uses either prebuilt, public, or custom classifiers.	GPU-based training and inference. Recognizes image and analyzes text, creates and trains classifiers with tooling for uploading and managing datasets.	Yes
* Neon	Neon is a fast, scalable, easy-to-use Python based deep learning framework that has been optimized down to the assembler level. Neon features a rich set of example and pre-trained models for image, video, text, deep reinforcement learning and speech applications.	Training, inference and deployment of deep learning models. Process over 442M images per day on a Titan X	Yes
Theano	Theano is a symbolic expression compiler that powers large-scale computationally intensive scientific investigations.	Abstract expression graphs for transparent GPU acceleration.	Single only
* Tensorflow	Google's TensorFlow is an open source software library for numerical computation using data flow graphs. Nodes in the graph represent mathematical operations, while the graph edges represent the multidimensional data arrays (tensors) communicated between them.	TensorFlow is flexible, portable and performant creating an open standard for exchanging research ideas and putting machine learning in products.	Yes
Torch7	Torch7 is an interactive development environment for machine learning and computer vision.	Computational back-ends for multicore GPUs.	Single only
Trakomatic OSense, Otrack	Video Analytics Solution for retail, supermarkets, shopping mall and banking.	People detection & tracking, Crowd density estimation, Gender classification and age estimation, Person re-identification.	Yes

Manufacturing: CAD and CAE

COMPUTATIONAL FLUID DYNAMICS

APPLICATION	DESCRIPTION	SUPPORTED FEATURES	MULTI-GPU SUPPORT
Altair AcuSolve	General purpose CFD software	Linear equation solver	Yes
ANSYS - Fluent	General purpose CFD software	Radiation heat transfer model, linear equation solver	Yes
Autodesk - Moldflow	Plastic mold injection software	Linear equation solver	Single only
* ANSYS - Polyflow	CFD software for the analysis of polymer and glass processing	Direct Solvers	Yes
CPFD Barracuda-VR and Barracuda	Fluidized bed modeling software	Linear equation solver, particle calculations	Single only
DHI - MIKE 21	2D hydrological modelling of coast and sea	Hydrodynamics; Advection-dispersion; sand and mud transport; coupled modelling; particle tracking; oil spill; ecological modelling; agent based modelling; various wave models.	Yes
DHI - MIKE FLOOD	1D & 2D urban, coastal, and riverine flood modelling	Hydrodynamics	Yes
FluiDyna aeroFluidX	Incompressible single-phase CFD software	Finite volume solver	Yes
FluiDyna - Culises for OpenFOAM	Solver library for general purpose CFD software	Linear equation solvers	Yes
FluiDyna nanoFluidX	General purpose CFD software	SPH solver	Yes
FluiDyna ultraFluidX	General purpose CFD software	Lattice-Boltzmann solver	Yes

* Indicates new application

midas NFX(CFD)	General purpose CFD software based on FEM	Linear equation solver (Iterative Solver and AMG Preconditioner)	Single only
* Numeca	Fine/ Turbo software product—a structured, multi-block, multi-grid CFD solver targeting the turbo machinery industry	Multi-grid solver	Yes
Prometech - Particleworks	Particle-based CFD software	Implicit and explicit solvers	Yes
Turbostream Ltd.	CFD software for turbomachinery flows	Explicit solver	Yes
Vratis Speed IT FLOW	Incompressible single-phase CFD software	Finite volume solver	Single only
Vratis SpeedIT for OpenFOAM	Solver library for general purpose CFD software	Linear equation solvers	Yes

Research CFD Developments

APPLICATION	DESCRIPTION	SUPPORTED FEATURES	MULTI-GPU SUPPORT
DualSPHysics	SPH-based CFD software	SPH model	Yes
FEFLO (GMU - Lohner)	General purpose CFD software for compressible and incompressible flows	Implicit and explicit solver	Yes
GIN3D (Boise St - Senocak)	General purpose CFD software for incompressible flows	Implicit solver	Yes
HiFiLES (Stanford - Jameson)	General purpose CFD software for compressible flows.	Explicit solver	Yes
HiPSTAR (University of Southampton - Sandberg)	CFD software for compressible reacting flows	Explicit solver	Yes
JENRE, Propel (NRL)	CFD software for compressible flows	Explicit solver	Yes
NASA FUN3D	General purpose CFD software	Linear equation solver	Single only
PyFR (Imperial College - Vincent)	General purpose CFD software for compressible flows.	High-order FR solver	Yes
S3D (Sandia and Oak Ridge NL)	Direct numerical solver (DNS) for turbulent combustion	Chemistry model	Yes

COMPUTATIONAL STRUCTURAL MECHANICS

APPLICATION	DESCRIPTION	SUPPORTED FEATURES	MULTI-GPU SUPPORT
Altair OptiStruct	Industry proven, modern structural analysis solver and solution for structural design and optimization.	Direct and iterative solvers	Yes
Altair RADIOSS Implicit	Simulation and analysis tool for structural mechanics	Direct and iterative solvers	Yes
ANSYS - Mechanical	Simulation and analysis tool for structural mechanics	Direct and iterative solvers	Yes
Dassault Systèmes SIMULIA Abaqus/ Standard	Simulation and analysis tool for structural mechanics	Direct sparse solver	Yes
Dassault Systèmes SIMULIA 3DEXPERIENCE	Realistic simulation solution (Uses Abaqus Standard for GPU computing).	Direct sparse solver	Single only
Impetus Afea	Predicts large deformations of structures and components exposed to extreme loading conditions.	Non-linear Explicit Finite-Element Solver	Yes
LS-DYNA Implicit	Simulation and analysis tool for structural mechanics	Linear equation solver	Yes
midas GTS NX	Simulation tool for geo-technical analysis	Linear equation solver(Multi Frontal Solver)	Single only
midas NFX(Structural)	Simulation and analysis tool for structural mechanics	Linear equation solver(Multi Frontal Solver)	Single only
MSC - Marc	Simulation and analysis tool for structural mechanics	Direct sparse solver	Yes
MSC Nastran	Simulation and analysis tool for structural mechanics	Direct sparse solver	Yes

Rocky DEM	Discrete Element Modeling (DEM)-based particle simulation software.	Explicit DEM solver (dry/sticky contact rheologies), 1-way & 2-way coupling with ANSYS Fluent and ANSYS Mechanical.	Single only
Siemens NX Nastran	Simulation and analysis tool for structural mechanics.	Linear equation solver	Single only

DESIGN AND VISUALIZATION

APPLICATION	DESCRIPTION	SUPPORTED FEATURES	MULTI-GPU SUPPORT
Allegorithmic Substance Designer	Material shader edition, market reference for procedural texture creation.	Iray rendering including textures/substances and bitmap texture export to render in any Iray powered compatible with MDL.	Yes
* Allegorithmic Substance Painter	Intuitive interactive 3D painting software with physics and particle support.	Iray rendering to enhance all artwork released with the software	Yes
Autodesk - AutoCAD	2D and 3D CAD design, drafting, modeling, architectural drawing, and engineering software. Supports Open GL. Native DWG™ support.	Surface, mesh, and solid modeling tools, model documentation tools, parametric drawing capabilities. Native DWG™ support. GRID Support.	Single only
Autodesk - AutoCAD Design Suite	AutoCAD 2014 software, plus tools to create, capture, connect, and showcase designs.	2D/3D display of designs, interactive 3D presentation with realistic materials, rendering-ray tracing.	Single only
Autodesk - 3ds Max	3D animation creative toolset for modeling, animation, simulation, and rendering for product and building designs.	3D modeling, mesh and surface modeling, improved Nitrous viewport performance, iray rendering.	Yes
Autodesk - Inventor	3D mechanical design, documentation, and product simulation.	Uses BIM for intelligent building components to improve design accuracy.	Single only
Autodesk - Revit	Building Information Modeling (BIM) for architecture, engineering, and construction.	Modeling (BIM) to design, build, and maintain higher-quality, more energy-efficient buildings. GRID support.	Single only
Chaos Group - V-Ray RT	GPU renderer	CUDA interactive GPU rendering	Yes
* Cast Software - WYSIWYG	The WYSIWYG software products, designed specifically for lighting professionals, offers a range of solutions to meet the needs of designers, assistants, electricians, console operators, teachers, and students.	The speed of wysiwyg's Shaded Views depends entirely on GPU, the GPU will have an easier time rendering ten risers consolidated into one Mesh, than rendering them as individual risers, Wysiwys also support NVIDIA SLI technologies.	Yes
Dassault Systèmes - CATIA	Accelerated UI rendering	Full OpenGL implementation including menus and dialog box.	Single only
Dassault Systèmes - CATIA Live Rendering	Realistic 3D Rendering on full CATIA 3D CAD model	Physically Based Rendering with no data preparation thanks to native NVIDIA Iray Photoreal integration integration and interactive realistic rendering using NVIDIA Iray IRT.	Yes + NVIDIA Quadro VCA
Dassault Systèmes - 3DEXCITE DeltaGen	Redefines high-end 3D visualization and realtime interaction. This latest version gives users a broad suite of robust new features to truly revolutionize processes and help increase visual quality, speed, and flexibility.	Interactive ray tracing and global illumination. Integration with Siemens TeamCenter. Cluster support Realtime & Offline Production Process Integration and scene building. Scene Analysis, Xplore DeltaGen, SDK for DeltaGen.	Yes
Dassault Systèmes - SOLIDWORKS	Covers all aspects of product development process with a seamless, integrated workflow—design, verification, sustainable design, communication and data management.	High performance in Shaded, Shaded w/ Edges, and RealView modes, FSAAs for sharp edges, Order Independent Transparency Real time photorealistic renderings with SOLIDWORKS Visualize, an Iray-based application.	Single only
* Dassault Systèmes - SOLIDWORKS Visualize	Easy to use photorealistic rendering software	Iray-based ray-tracing, animation support, network rendering.	Yes + NVIDIA Quadro VCA

* Indicates new application

NVIDIA Iray	A ready-to-integrate, physically-based, photorealistic rendering solution.	Iray Interactive; Iray Photoreal; Iray Cluster. Fast interactive ray tracing; Physically-based, global-illumination rendering; Distributed cluster rendering.	Yes
Otoy - Octane Render	GPU renderer	GPU rendering	Yes
PTC Creo Parametric	Parametric design solution suite.	Anti-aliasing, better lighting and enhanced shaded-with-edges mode. Immersive design environment with realistic materials. GRID Support.	Single only
Siemens PLM Software NX and Teamcenter	Product lifecycle management solutions from design to simulation to production to service.	Design software, NX, and PLM viewer applications, TcVis and Active Workspace. GRID support.	Single only
* Top Systems T-FLEX CAD	3D and 2D parametric design, simulation, photorealistic rendering	High performance visualization, real time photorealistic rendering	Yes
* VRED	VRED™ 3D visualization software helps automotive designers and engineers create product presentations, design reviews, and virtual prototypes. Use Digital Prototyping to quickly visualize ideas and evaluate designs.	Enhanced geometry behavior, Automotive product interoperability, Navigation in a scene, Import Alias layer structure, Asset Manager improvements, Integrated file converter, Analytic rendering modes, Gap Analysis tool, Oculus Rift support, Animation module, Multiple rendering modes, Subsurface scattering, Displacement mapping	Yes

ELECTRONIC DESIGN AUTOMATION

APPLICATION	DESCRIPTION	SUPPORTED FEATURES	MULTI-GPU SUPPORT
Altair FEKO	3D EM modeling and simulation	FDTD solver MoM solver	Yes
ANSYS - HFSS	Simulation tool for modeling 3-D full-wave electromagnetic fields in high-frequency and high-speed electronic components.	Transient solver	Yes
ANSYS - Nexxim	Circuit simulation engine for RF/analog/mixed-signal IC design; IBIS-AMI analysis speedup with GPU computing.	AMI analysis	Single only
CST STUDIO SUITE	3D Electromagnetic modeling and simulation	Several different solvers	Yes
D2S TrueMask	GPGPU-based computational lithography acceleration technology.	Simulation and data preparation for Mask Writing, Geometric manipulation of large semiconductor design & manufacturing data, eBeam, Mask Process, and lithography aerial image Simulation, image processing.	Yes
Delcross- Savant	Simulation tool for installed antenna performance and antenna-to-antenna coupling.	High-frequency solver	Yes
JMAG	FEA software for electromechanical design. Fast solver / High quality mesh / Advanced modeling technologies.	EM transient solver EM time harmonic solver EM static solver	Yes
KeySight - ADS	Simulation tool for design of RF, microwave and high speed digital circuits.	Transient Convolution simulation with BSIM4 models	Single only
KeySight - EMPro	Modeling and simulation environment for analyzing 3D EM effects of high speed and RF/Microwave components.	FDTD solver	Yes
Remcom - XFDTD	3D EM modeling and simulation	FDTD solver	Yes
Rocketick - RocketSim	Verilog simulation	Verilog simulation	Yes
SPEAG - SEMCAD-X	3D EM modeling and simulation	FDTD solver	Yes

Media and Entertainment

ANIMATION, MODELING AND RENDERING

APPLICATION	DESCRIPTION	SUPPORTED FEATURES	MULTI-GPU SUPPORT
3DAliens- Glu3d	SPH fluid simulation	Faster simulation	Single only
AAA Studio - FurryBall	GPU renderer	CUDA and DirectX GPU rendering	Single only
Autodesk - 3ds Max + NVIDIA Iray	3D modeling, animation, and rendering	Iray interactive, photorealistic and physically correct rendering	Yes
Autodesk - Maya	3D modeling, animation, and rendering	Increased model complexity, larger scenes	Yes
Autodesk - Motion Builder	Character animation and motion capture	Increased model complexity at interactive rates	Single only
Autodesk - Mudbox	3D sculpting	Increased model complexity at interactive rates	Single only
Blastcode - Kilton/Megaton	Physics-based simulation plug in	Faster simulation	Single only
Cebas - mosquitoRender	GPU renderer	CUDA-based GPU rendering	Yes
Chaos Group - V-Ray RT	GPU renderer	CUDA interactive GPU rendering	Yes
Jawset - TurbulenceFD	Physics-based simulation plug-in	Maximus supported GPU simulation using CUDA	Single only
Maxon - Cinema 4D	3D modeling, animation, and rendering	Increased model complexity at interactive rates	Single only
NewTek - Lightwave	3D modeling, animation, and rendering	Increased model complexity at interactive rates	Single only
Otoy - Octane Render	GPU renderer	GPU rendering	Yes
Pixologic - Sculptiris	3D sculpting	Increased model complexity at interactive rates	Single only
Redshift - Renderer	GPU-accelerated, biased renderer	CUDA-based GPU final-frame rendering	Yes
Side Effects - Houdini	3D modeling, animation, and rendering	Maximus supported GPU simulation using OpenCL	Single only
The Foundry - Mari	3D paint	Increased model complexity at interactive rates	Single only
The Foundry - Modo	3D modeling, animation and rendering	Increased model complexity, larger scenes	Single only

COLOR CORRECTION AND GRAIN MANAGEMENT

APPLICATION	DESCRIPTION	SUPPORTED FEATURES	MULTI-GPU SUPPORT
Adobe - SpeedGrade CC	Color grading	Real-time grading and finishing with Lumetri Deep Color Engine.	Single only
ARRI - RAW Converter	RAW de-Bayering and primary color grading	CUDA-accelerated de-bayering and grading	Single only
Assimilate - Scratch	Color grading and finishing	Accelerated debayering for real-time digital finishing	Single only
Blackmagic Design - DaVinci Resolve	Color grading and editing	Real-time color correction and de-noising	Yes
Canon - Cinema RAW SDK	RAW de-bayering	GPU-accelerated de-bayering	Single only
CinnaFilm - Dark Energy	Application and plug-in for image enhancement	Image de-noising and restoration	Yes
Digital Vision - Nucoda	Color grading	De-bayering for color correction	Single only
* Fastvideo - Fast CinemaDNG Processor	RAW video debayering, denoising and color correction completely on GPU side	Full-sized video processing and playback in realtime, 4K, 6K, and 8K supported	Yes
Fastvideo - GPU Debayer	High performance GPU debayer	High performance debayer on CUDA	Yes
Filmlight - Baselight	Color grading	Real-time color correction	Yes
Marquise Technologies - Rain	Color grading	CUDA-based real-time color correction	Single only

* Indicates new application

Red Digital Cinema - REDCINE-X PRO	Primary color grading	CUDA-accelerated de-bayering and grading	Single only
Red Giant - Magic Bullet Looks	Color and finishing tools	Faster effects	Single only
Snell Advanced Media - Pablo Rio	Color grading and finishing	Real time color correction	Yes
SGO - Mistika	Color grading and finishing	Real-time color correction and finishing	Single only
The Foundry - COLORWAY	Color grading	Accelerated color grading	Single only
The Pixel Farm PFClean	Image restoration and remastering	CUDA-based image processing acceleration	Single only
Wavelet Beam - Grain and Noise Reducer	Video noise reduction	CUDA-accelerated grain and noise reduction	Yes

COMPOSITING, FINISHING AND EFFECTS

APPLICATION	DESCRIPTION	SUPPORTED FEATURES	MULTI-GPU SUPPORT
Adobe - After Effects CC	Motion graphics and effects	3D ray tracing engine based on NVIDIA OptiX	Yes
Autodesk - Flame Premium	Finishing and color grading	Integrated toolset for 3D VFX, editorial, and color grading	Yes
Blackmagic Design - Fusion	Effects and compositing	Faster effects	Single only
Boris FX - Continuum Complete	Visual effects plug-in	Faster effects	Single only
CoreMelt - Complete	Visual effects plug-in	Faster effects	Single only
GenArts - Monsters GT	Visual effects plug-in	Faster effects	Single only
GenArts - Sapphire	Visual effects plug-in	Faster effects	Single only
Neat Video - Open FX	Video noise reduction plug-in	Faster effects	Single only
NewBlueFX - Video Essentials	Video effects plug-in	Faster effects	Single only
Pixelan - FilmTouch	Video effects plug-in	Faster effects	Single only
Re:Vision Effects - Twixtor	Visual effects plug-in	Faster effects	Single only
Red Giant - Effects Suite	Visual effects plug-in	Faster effects	Single only
ROBUSKEY	Chroma keyer plug-in	Faster effects	Single only
SGO - Mamba FX	High-end compositing	Faster keying, tracking, painting and restoration	Single only
The Foundry - HIERO	Shot management, conform and review timeline	Better interactivity	Single only
The Foundry - NUKE, NUKEX and NUKE Studio	Compositing tools with 3D tracker	Faster effects	Single only
Video Copilot - Element 3D	3D object based particle system	Faster effects	Yes
Video Copilot - Twitch	Video effects plug-in for After Effects	Faster effects	Single only

EDITING

APPLICATION	DESCRIPTION	SUPPORTED FEATURES	MULTI-GPU SUPPORT
Adobe - Photoshop CC	Image editing	Over 30 effects for smoother image manipulation in Mercury Graphics Engine	Single only
Adobe - Premiere Pro CC	Video editing	Mercury Playback Engine for real-time video editing & accelerated rendering	Yes
Apple - Final Cut Pro	Video editing	Faster effects	Single only
Autodesk - Smoke	Finishing and editing	Faster effects	Single only
Avid - Media Composer	Video editing	Faster video effects, unique stereo 3D capabilities	Single only

EditShare - Lightworks	Video editing	Faster effects	Single only
Grass Valley - Edius Pro	Video editing	Faster effects	Single only
Imagine Communications - Velocity	Video editing	Faster effects	Single only
Snell Advanced Media - Qube	Broadcast video editing	Faster video effects, unique stereo 3D capabilities	Single only
Sony - Catalyst Browse, Prepare and Edit	Video editing	Faster effects, transitions and encoding	Single only
Sony - Vegas Pro	Video editing	Faster video effects and encoding	Single only

ENCODING AND DIGITAL DISTRIBUTION

APPLICATION	DESCRIPTION	SUPPORTED FEATURES	MULTI-GPU SUPPORT
ArcVideo - Core	Video processing and transcoding	Accelerated transcoding and encoding	Yes
ArcVideo - Live	High-density, real-time video processing and encoding.	Accelerated broadcast encoding with NVIDIA CUDA and NVENC.	Yes
Cinnafilm - Tachyon	Standards conversion	Video processing and frame rate conversion	Yes
Comprimato - JPEG2000 Codec	JPEG2000 encoding and decoding for DCP, IMF, video editing, broadcast contribution, and archiving.	Faster than real-time UltraHD / 4K, lossy and mathematically lossless, high bit-depth (HDR), performance scalable, GPU accelerated.	Yes
Dalet - Amberfin	Transcoding and video quality analysis	GPU-accelerated video procession and encoding	Single only
Elemental - Elemental Live	Live streaming video processing and encoding	Video encoding and video processing	Yes
Elemental - Elemental Server	File-based video processing and encoding	Video encoding and video processing	Yes
ERLAB - Multiplatform Transcoder	Video processing and encoding software	Pre-processing encoding, decoding, post-processing and delivery	Single only
* Fastvideo - GPU Image Processing SDK	Full image processing pipeline on CUDA	Full image processing pipeline on GPU for real-time imaging applications: Flat Field correction, Demosaicing, Denoising, Color correction, LUT, Resize, Sharp, OpenGL output, JPEG, JPEG2000, Raw Bayer, H.264 encoding	Yes
Fastvideo - H.264 encoder	H.264 encoding on GPU	NVENC accelerated video encoding	Yes
Fastvideo - SDK	JPEG, JPEG2000, Raw Bayer codecs	Fast JPEG, JPEG2000, Raw Bayer encoding and decoding on CUDA	Yes
Interra - Baton	Video quality analysis	GPU accelerated video quality assessment	Single only
isovideo - Viarte	Video standards conversion	CUDA-accelerated video procession and encoding	Yes
METUS - Ingest	Video recording, transcoding, and streaming software.	CUDA Accelerated video recording, encoding and broadcast transcoding	Single only
Root6 - Content Agent	Automated transcoding and workflow management	GPU-accelerated video procession and encoding	Yes
Sorenson Media - Squeeze	Video transcoding application and plug-In	Video encoding and video processing	Yes
Snell Advanced Media - Alchemist on Demand	Video standards conversion	GPU-accelerated video procession and encoding	Yes
Tektronix - Aurora	Automated video quality measurement	GPU-accelerated video quality assessment	Single only
Telestream - Vantage Lightspeed	Video transcoding and processing	Video encoding and video processing	Yes
Wowza - Transcoder	H.264 video encoding	NVENC accelerated video encoding	Single only

* Indicates new application

ON-AIR GRAPHICS

APPLICATION	DESCRIPTION	SUPPORTED FEATURES	MULTI-GPU SUPPORT
Brainstorm - eStudio	Virtual sets and motion graphics	Real-time rendering	Single only
ChyronHego - GS2 Graphics Engine	On-air graphics	Real-time rendering	Single only
ChyronHego - Mosaic	On-air graphics	Real-time rendering	Single only
* ChyronHego	On-air graphics and virtual sets	Real-time rendering	Single only
Cinegy - Type	On-air Graphics	Real-time rendering	Single only
Dalet - Cube	On-air Graphics	Real-time rendering	Single only
Grass Valley - Vertigo	On-air Graphics	Real-time rendering	Single only
Imagine Communications - Nexio Channelbrand	On-air graphics	Real-time rendering	Yes
Imagine Communications - Nexio G8	On-air graphics	Real-time rendering	Single only
Imagine Communications - Nexio TitleOne	On-air graphics	Real-time rendering	Single only
Monarch - Broadcast Dscript 3D	3D on-air graphics	Real-time rendering	Single only
Monarch - Virtuoso	Virtual sets and motion graphics	Real-time rendering	Single only
Pixel Power - Clarity	On-air graphics	Real-time rendering	Single only
RT Software - tOG	On-air graphics	Real-time rendering	Single only
Vizrt - Viz Engine	On-air graphics and virtual sets	Real-time rendering	Single only
Wasp3D - CG	On-air graphics and virtual sets	Real-time rendering	Single only

ON-SET, REVIEW AND STEREO TOOLS

APPLICATION	DESCRIPTION	SUPPORTED FEATURES	MULTI-GPU SUPPORT
Autodesk - RV	Review and approval of 4K content	Real-time	Single only
3ality Technica - Intellicam	3D stereo camera adjustment	CUDA-based 3D imaging	Single only
Binocle3D - Disparity Killer	3D stereoscopic workflow	CUDA-based 3D imaging	Single only
Blackmagic Design - Dimension	3D stereoscopic workflow	Real-time	Single only
BlueFish - Fluid 4K Review	Review and approval of 4K content	Real-time video review	Single only
Colorfront - On-Set Dailies	Review, color grading and transcoding on set	Real-time	Yes
Lightcraft - Previzion	On-set virtual production	Real-time, virtual set production	Single only
MTI Film - Cortex Dailies	Review, color grading and transcoding on set	CUDA accelerated grading and transcoding	Single only
The Pixel Farm - PFTrack	3D scene creation and tracking	CUDA-accelerated tracking	Yes

WEATHER GRAPHICS

APPLICATION	DESCRIPTION	SUPPORTED FEATURES	MULTI-GPU SUPPORT
Accuweather - Cinemative HD	Weather graphics	Real-time	Single only
Accuweather - Storyteller	Weather graphics	Real-time	Single only
* ChyronHego - Metacast	Weather graphics	Real-time	Single only
MeteoGraphics - MeteoEarth	Weather graphics	Real-time	Single only
WSI - Max Weather	Weather graphics	Real-time	Single only

Medical Imaging

APPLICATION	DESCRIPTION	SUPPORTED FEATURES	MULTI-GPU SUPPORT
* PowerGrid	Advanced MRI reconstruction modeling	Discrete Fourier Transform	Yes

Oil and Gas

APPLICATION	DESCRIPTION	SUPPORTED FEATURES	MULTI-GPU SUPPORT
Acceleware AxRTM AxKTM	Seismic processing	RTM, Kirchhoff, control source, electromagnetism, forward modeling.	Yes
BRS Labs AISight for SCADA	Proactive integrity management and real-time precursor alerts for enhanced SCADA operations in oil and gas.	24/7 real-time analysis and alerting scaling to thousands of sensors across remote and geographically dispersed locations including historical analysis and trend reports.	Yes
CGG- GeoVation	Seismic processing	Multiple algorithms (RTM, etc)	Yes
CGG- Inside Earth	Seismic interpretation	Horizon orientation attributes; automated fault extraction, Curvature Attributes.	Yes
Echelon Stoneridge Technology	Reservoir simulator	Fully GPU-accelerated reservoir model, including dual-perm, dual porosity, pressure varying perm and porosity. Eclipse compatible input deck.	Yes
Esri ArcGIS for Desktop (ArcMap and ArcGIS Pro) – Spatial Analyst and 3D Analyst	Determines the raster surface locations visible to a set of observer features, using geodesic methods.	Viewshed2 transforms the elevation surface into a geocentric 3D coordinate system and runs 3D sightlines to each transformed cell center.	Yes
ffa Geoteric	Seismic interpretation	Attributes calculations, geobodies extraction	Yes
ffa SEA3D Pro	Seismic interpretation	Attributes calculations, geobodies extraction	Yes
ffa SVI Pro	Seismic interpretation	Attributes calculations, geobodies extraction	Yes
GeoMage Multifocusing	Seismic processing	Advanced seismic imaging technologies and services, as well as interpretation, geological modeling, and reservoir characterization.	Yes
HUE Headwave Suite	Seismic interpretation	Attributes calculations, Volume Rendering	Yes
HUE HUESpace	Seismic interpretation	Interpretation development platform	Yes
OpenGeo Solutions OpenSeis	Seismic processing	Spectral Decomposition	Yes
Panorama Tech	Seismic processing, Modeling	Multiple algorithms (RTM, etc)	Yes
Paradigm Echos RTM	Seismic processing	RTM algorithm	Yes
Paradigm Geophysical VoxelGeo	Seismic interpretation	Volume Rendering, Horizon Flattening	Yes
Paradigm SKUA	Reservoir modeling	Faults, Horizons and Flow Simulation Grid	Yes
PumaFlow IFP	Reservoir simulation	GPU-accelerated linear solver	Yes
Ridgeway Kite Simulator	Reservoir simulation	Fully GPU-accelerated reservoir model, including surface facilities and multiple realization history matching.	Yes
Roxar RMS	Reservoir modeling	Multi GPU capabilities via HUESpace	Yes
Schlumberger Omega2 RTM	Seismic processing	Multiple algorithms (RTM, etc)	Yes
Seismic City Prestack Interpretation	Seismic processing	Multiple algorithms (RTM, etc)	Yes
SpectraSeis	Seismic processing	Full elastic wave-equation imaging and analysis of microseismic fracture data.	Yes

* Indicates new application

Stoneridge Technologies GAMPACK	Reservoir simulation	GPU Algebraic MultiGrid Package	Yes
Tsunami A2011	Seismic processing/Imaging package	RTM processing	Yes
Tsunami RTM	Seismic processing	RTM algorithm	Yes

Research: Higher Education and Supercomputing

COMPUTATIONAL CHEMISTRY AND BIOLOGY

Bioinformatics

APPLICATION	DESCRIPTION	SUPPORTED FEATURES	MULTI-GPU SUPPORT
Arioc	High-throughput read alignment with GPU-accelerated exploration of the seed-and-extend search space	Single-end alignment, paired-end alignment <ul style="list-style-type: none"> Output in SAM or database-ready binary formats Multiple GPU implementation 	Yes
BarraCUDA	Sequence mapping software	Alignment of short sequencing reads, alignment of indels with gap openings and extensions.	Yes
BEAGLE-lib	BEAGLE is a high-performance library that can perform the core calculations at the heart of most Bayesian and Maximum Likelihood phylogenetics packages. It can make use of highly-parallel processors such as those in graphics cards (GPUs) found in many PCs.	Evaluation of likelihood for sequence evolution on trees and Arbitrary models (e.g. nucleotide, amino acid, codon) Speed-ups (over CPU only version): nucleotide model = up to 25x, codon model = up to 50x.	Yes
Campaign	An open-source library of GPU-accelerated data clustering algorithms and tools.	K-means (and Kps-means, a K-means variant for GPUs with parallel sorting for improved performance), K-medoids, K-centers (a K-medoids variant in which medoids are placed only once according to a heuristic), Hierarchical clustering and Self-organizing map.	Single only
CUDASW++	Open source software for Smith-Waterman protein database searches on GPUs.	Parallel search of Smith-Waterman database.	Yes
CUSHAW	Parallelized short read aligner	Parallel, accurate long read aligner for large genomes	Yes
G-BLASTN	GPU-accelerated nucleotide alignment tool based on the widely used NCBI-BLAST.	Blastn and megablast modes of NCBI-BLAST	Single only
GPU-Blast	Local search with fast k-tuple heuristic	Protein alignment according to BLASTP	Single only
mCUDA-MEME	Ultrafast scalable motif discovery algorithm based on MEME .	Scalable motif discovery algorithm based on MEME.	Yes
MUMmer GPU	High-throughput local sequence alignment program	Aligns multiple query sequences against reference sequence in parallel.	TBD
NVBIO	NVBIO is an open source C++ library of reusable components designed to accelerate bioinformatics applications using CUDA.	Data structures, algorithms, and utility routines useful for building complex computational genomics applications on CPU-GPU systems.	Yes
NVBowtie	A largely complete implementation of the Bowtie2 aligner on top of NVBIO.	Good coverage of Bowtie2 features and comparable quality results.	Yes
PEANUT	Read mapper for DNA or RNA sequence reads to a known reference genome.	Achieves supreme sensitivity and speed compared to current state of the art read mappers like BWA MEM, Bowtie2 and RazerS3. PEANUT reports both only the best hits or all hits.	Single only

REACTA	A modified version of GCTA with improved computational performance, support for Graphics Processing Units (GPUs), and additional features. The purpose of REACTA is to quantify the contribution of genetic variation to phenotypic variation for complex traits.	GRM creation, REML analysis, Regional Heritability (including multi-GPU).	Yes
SeqNFind	SeqNFind® is a powerful tool suite that addresses the need for complete and accurate alignments of many small sequences against entire genomes utilizing a unique hardware/software cluster system for facilitating bioinformatics research in Next Generation sequencing and genomic comparisons.	Hardware and software for reference assembly, blast, SW, HMM, de novo assembly.	Yes
SOAP3	GPU-based software for aligning short reads with a reference sequence. It can find all alignments with k mismatches, where k is chosen from 0 to 3.	Short read alignment tool that is not heuristic based; reports all answers.	Yes
SOAP3-dp	SOAP3-dp: Ultra-fast GPU-based tool for short read alignment via index-assisted dynamic programming.	Borrows-Wheeler Transformation, Dynamic Programming.	Yes
UGene	Open source Smith-Waterman for SSE/CUDA, Suffix array based repeats finder and dotplot.	Fast short read alignment.	Yes
WideLM	Fits numerous linear models to a fixed design and response.	Parallel linear regression on multiple similarly-shaped models.	Yes

Molecular Dynamics

APPLICATION	DESCRIPTION	SUPPORTED FEATURES	MULTI-GPU SUPPORT
ACEMD	GPU simulation of molecular mechanics force fields, implicit and explicit solvent	Written for use only on GPUs.	Yes
AMBER	Suite of programs to simulate molecular dynamics on biomolecule.	PME MD Explicit Solvent and GB Implicit Solvent	Yes
CHARMM	MD package to simulate molecular dynamics on biomolecule.	Implicit (5x), Explicit (2x) Solvent via OpenMM, now ported natively to GPUs.	Yes
DESMOND	High-speed molecular dynamics simulations of biological systems.	The code uses novel parallel algorithms and numerical techniques to achieve high performance and accuracy.	Yes
ESPReso	Highly versatile software package for performing and analyzing scientific Molecular Dynamics many-particle simulations of coarse-grained atomistic or bead-spring models as they are used in soft-matter research in physics, chemistry and molecular biology.	Hydrodynamic / Electrokinetic forces P3M electrostatics.	Yes
Folding@Home	A distributed computing project that studies protein folding, misfolding, aggregation, and related diseases.	Powerful distributed computing molecular dynamics system; implicit solvent and folding.	Yes
GPUgrid.net	A distributed computing project that uses GPUs for molecular simulations.	High-performance all-atom biomolecular simulations; explicit solvent and binding.	Yes
GROMACS	Simulation of biochemical molecules with complicated bond interactions.	Implicit (5x), Explicit (2x) Solvent	Yes
HALMD	Large-scale simulations of simple and complex liquids.	Simple fluids and binary mixtures (pair potentials, high-precision NVE and NVT, dynamic correlations).	Single only
HOO MD-Blue	Particle dynamics package written grounds up for GPUs.	Written for use only on GPUs	Yes
LAMMPS	Classical molecular dynamics package	Lennard-Jones, Gay-Berne, Tersoff, and dozens more potentials	Yes

* Indicates new application

* MELD	OpenMM plugin written for GPUs	Integrative approach to combine physics and information Orders of magnitude faster protein folding than brute force MD	Yes
NAMD	Designed for high-performance simulation of large molecular systems.	Full electrostatics with PME and most simulation features; 100M atom capable.	Yes
OpenMM	Library and application for molecular dynamics for HPC with GPUs.	Implicit and explicit solvent, custom forces	Yes
PolyFTS	Classical molecular simulation code for studying polymer self-assembly and thermodynamics.	Uses auxiliary fields as the fundamental simulation degrees of freedom, Uses cuFFT extensively (~ 80%), CUDA code is ~20%, Multi CPU or single GPU per job, 1x = Ivy Bridge E5-2690 CPU all 10 cores, 3-8X on K40 or K80 (utilizing 1/2 of the K80).	Single only
SOP-GPU	SOP-GPU package, where SOP stands for the Self Organized Polymer Model fully implemented on a GPU, is a scientific software package designed to perform Langevin Dynamics Simulations of the mechanical or thermal unfolding, and mechanical indentation of large biomolecular systems in the experimental subsecond (millisecond-to-second) timescale.	Langevin dynamics simulations using the coarse-grained Self Organized Polymer (SOP) model, Multiple simulation trajectories can be performed simultaneously on a single GPU, Calpha and Calpha-Cbeta models are supported, Simulations of protein forced unfolding, Novel simulations of nanoindentation in silico, Support for hydrodynamic interactions, Up to ~100 ms of simulation time per day, Systems of up to 1,000,000 amino-acids (on GPUs with 6GB or great memory).	Single only

Quantum Chemistry

APPLICATION	DESCRIPTION	SUPPORTED FEATURES	MULTI-GPU SUPPORT
Abinit	Allows to find total energy, charge density and electronic structure of systems made of electrons and nuclei within DFT.	Local Hamiltonian, non-local Hamiltonian, LOBPCG algorithm, diagonalization/orthogonalization.	Yes
ACES III	Takes best features of parallel implementations of quantum chemistry methods for electronic structure.	Integrating scheduling GPU into SIAL programming language and SIP runtime environment.	Yes
ADF	Density Functional Theory (DFT) software package that enables first-principles electronic structure calculations.	Geometry optimizations and frequency calculations with GGA functionals.	Yes
BigDFT	Implements density functional theory by solving the Kohn-Sham equations describing the electrons in a material.	DFT; Daubechies wavelets, part of Abinit	Yes
CASTEP [In development]	CASTEP is a leading code for calculating the properties of materials from first principles. Using density functional theory, it can simulate a wide range of properties of materials proprieties including energetics, structure at the atomic level, vibrational properties, electronic response properties etc.	TBD	Yes
CP2K	Program to perform atomistic and molecular simulations of solid state, liquid, molecular and biological systems.	DBCSR (space matrix multiply library)	Yes
GAMESS-UK	The general purpose ab initio molecular electronic structure program for performing SCF-, DFT- and MCSCF-gradient calculations.	(ss/ls) type integrals within calculations using Hartree-Fock ab initio methods and density functional theory. Supports organics and inorganics.	Yes
GAMESS-US	Computational chemistry suite used to simulate atomic and molecular electronic structure.	Libqc with Rys Quadrature Algorithm, Hartree-Fock, MP2 and CCSD.	Yes
Gaussian [In development]	Predicts energies, molecular structures, and vibrational frequencies of molecular systems.	Joint NVIDIA, PGI and Gaussian collaboration.	Yes

GPAW	Real-space grid DFT code written in C and Python	Electrostatic poisson equation, orthonormalizing of vectors, residual minimization method (rmm-diis).	Yes
gWL-LSMS	Materials code for investigating the effects of temperature on magnetism.	Generalized Wang-Landau method	Yes
LATTE	Density matrix computations	CU_BLAS, SP2 Algorithm	Yes
* LSDalton	Linear-scaling HF and DFT code suitable for large molecular systems, now also with some CCSD capabilities	[T] correction to the CCSD energy. • RI-MP2 energy/gradient (in development). • CCSD energy (in development). • GPU-based ERI generator (in development).	Yes
MOLCAS	Methods for calculating general electronic structures in molecular systems in both ground and excited states.	CU_BLAS	Single only Additional GPU support coming in Version 8
MOPAC2012	Semiempirical Quantum Chemistry	Pseudodiagonalization, full diagonalization, and density matrix assembling via Magma libraries.	Single only
NWChem	Calculations	Triples part of Reg-CCSD(T), CCSD and EOMCCSD task schedulers.	Yes
Octopus	Used for ab initio virtual experimentation and quantum chemistry calculations.	Full GPU support for ground-state, real-time calculations; Kohn-Sham Hamiltonian, orthogonalization, subspace diagonalization, poisson solver, time propagation.	TBD
ONETEP [In development]	ONETEP (Order-N Electronic Total Energy Package) is a linear-scaling code for quantum-mechanical calculations based on density-functional theory.	TBD	Yes
PEtot	First principles materials code that computes the behavior of the electron structures of materials.	Density functional theory (DFT) plane wave pseudopotential calculations.	Yes
PWMat	The fastest plane wave pseudopotential code for density functional theory simulations based on GPU.	It can perform extremely fast plane wave DFT calculations based on GPU machines and single precision and double precision mixed algorithm. It deploys the state-of-the-art electronic structure calculation methods with many new features and algorithm innovations. It performs ab initio material science simulations, designed for both theoretical and experimental groups.	Yes
Q-CHEM	Computational chemistry package designed for HPC clusters.	Various features including RI-MP2	Single Only
QMCPACK	Solves the many-body Schrodinger equation for electronic structures using a quantum Monte Carlo method.	Main features	Yes
Quantum Espresso/ PWscf	An integrated suite of computer codes for electronic structure calculations and materials modeling at the nanoscale.	PWscf package: linear algebra (matix multiply), explicit computational kernels, 3D FFTs.	Yes
QUICK	QUICK is a GPU-enabled ab initio quantum chemistry software package.	Running Hartree-Fock and DFT energy on GPU, Supports s, p, d, f orbitals on energy calculation, HF gradient with s,p,d orbital support, GPU-based ERI generator.	Yes
TeraChem	Quantum chemistry software designed to run on NVIDIA GPU.	Full GPU-based solution; Performance compared to GAMESS CPU version.	Yes
VASP	Complex package for performing ab-initio quantum-mechanical molecular dynamics (MD) simulations using pseudopotentials or the projector-augmented wave method and a plane wave basis set.	Blocked Davidson (ALGO = NORMAL & FAST), RMM-DIIS (ALGO = VERYFAST & FAST), K-Points and optimization for critical step in exact exchange calculations.	Yes

Visualization and Docking

APPLICATION	DESCRIPTION	SUPPORTED FEATURES	MULTI-GPU SUPPORT
Amira®	A multifaceted software platform for visualizing, manipulating, and understanding Life Science and bio-medical data.	3D visualization of volumetric data and surfaces	Single only
BINDSURF	A virtual screening methodology that uses GPUs to determine protein binding sites.	Allows fast processing of large ligand databases	Single only
BUDE	Molecular docking program	Empirical Free Energy Force field	Single only
FastROCS	Molecule shape comparison application	Real-time shape similarity searching/ comparison	Yes
* Interactive Molecule Visualizer	Experimental interactive molecule visualizer based on a ray-tracing engine.	Targeting high quality images and ease of interaction, IMV uses the latest GPU computing acceleration techniques, combined with natural user interfaces such as Kinect and Wiimotes.	Single only
Molegro Virtual Docker 6	Method for performing high accuracy flexible molecular docking.	Energy grid computation, pose evaluation and guided differential evolution.	Single only
PaPaRa 2.0	A Vectorized Algorithm for Probabilistic Phylogeny-Aware Alignment Extension.	Up to 15-fold run time improvements by deploying SIMD vector intrinsics to accelerate the alignment kernel.	Single only
PIPER Protein Docking	Protein-protein docking program	Molecule docking	TBD
PyMol	User-sponsored molecular visualization system on an open-source foundation	Lines: 460% increase Cartoons: 1246% increase Surface: 1746% increase Spheres: 753% increase Ribbon: 426% increase	Single only
VEGA ZZ	Molecular Modeling Toolkit	Virtual logP, molecular surface values	Single only
VMD	Visualization and analyzing large bio-molecular systems in 3-D graphics	High quality rendering, large structures (100M atoms), analysis and visualization tasks, multiple GPU support for display of molecular orbitals	Yes

NUMERICAL ANALYTICS

APPLICATION	DESCRIPTION	SUPPORTED FEATURES	MULTI-GPU SUPPORT
Accelereyes- ArrayFire	Comprehensive GPU function library	Hundreds of functions for math, signal/ image processing, statistics, and more.	Yes
HiPLAR	3High Performance Linear Algebra in R	Supports GPU and multi-core platforms, compatible with legacy R code, no new data types or operators, auto-tuning, support for R Matrix package.	Yes (for algebra functions via Magma 1.5 or later)
Mathematica Wolfram	A symbolic technical computing language and development environment.	Development environment for CUDA and OpenCL. GPU acceleration for Wolfram Finance Platform.	Yes
Mathworks - MATLAB	GPU acceleration for MATLAB (high-level technical computing language).	Support for 200+ of most used MATLAB functions (incl. Signal Processing, Image Processing, Communications Systems, etc).	Yes
NMath Premium	GPU-accelerated math and statistics for .NET, automatically detects the presence of a CUDA-enabled GPU at runtime and seamlessly redirects appropriate computations to it.	Automatically offloads computations to the GPU.	Single only

PHYSICS

APPLICATION	DESCRIPTION	SUPPORTED FEATURES	MULTI-GPU SUPPORT
AWP	The Anelastic Wave Propagation, AWP-ODC, independently simulates the dynamic rupture and wave propagation that occurs during an earthquake. Dynamic rupture produces friction, traction, slip, and slip rate information on the fault. The moment function is constructed from this fault data and used to initialize wave propagation.	3D Finite Difference Computation	Single only
BQCD	Lattice quantum chromodynamics application, used for nuclear and high energy physics calculations.	Wilson-clover fermion linear solver	Yes
* CASTRO	A multicomponent compressible hydrodynamic code for astrophysical flows including self-gravity, nuclear reactions and radiation. CASTRO uses an Eulerian grid and incorporates adaptive mesh refinement (AMR). The approach uses a nested hierarchy of logically-rectangular grids with simultaneous refinement in both space and time.	Gravitational Field Solver	Yes
Changa	Astrophysics code performs collisionless N-body simulations. It can perform cosmological simulations with periodic boundary conditions in comoving coordinates or simulations of isolated stellar systems.	Gravitational Model has been accelerated using CUDA	Single only
Chemora	Chemora is a system for performing simulations of systems described by differential equations running on accelerated computational clusters.	Chemora embeds the equations' computational kernels into dynamically compiled loop nests shaped for input size and GPU structure.	Yes
Chroma	Lattice Quantum Chromodynamics (LQCD)	Wilson-clover fermions, Krylov solvers, Domain-decomposition	Yes
CPS	Lattice quantum chromodynamics application, used for nuclear and high energy physics calculations.	Wilson, domain-wall and Möbius fermion linear solvers	Yes
ENZO	3D block-structured AMR code for cosmological structure formation.	Accelerated magneto hydrodynamics solvers	Yes
GTC	Simulates microturbulence and transport in magnetically confined fusion plasma.	Electron push and shift (accounting for >80% of run time)	Yes
GTC-P	A development code for optimization of plasma physics. Full science and data sets are included, but in a simplified form to allow performance testing and tuning.	Optimized with CUDA. OpenACC development underway	Yes
GTS	Simulates microturbulence and the motion of charged particles and interactions in fusion plasma.	Push and shift for both electron and ion dynamics	Yes
HACC	Simulates N-Body Astrophysics	This code has been optimized with CUDA runs in full production mode.	Yes
* MAESTRO	A low Mach number stellar hydrodynamics code that can be used to simulate long-time, low-speed flows that would be prohibitively expensive to model using traditional compressible code.	Gravitational Field Solver	Yes
MILC	Lattice Quantum Chromodynamics (LQCD) codes simulate how elemental particles are formed and bound by the "strong force" to create larger particles like protons and neutrons.	Staggered fermions, Krylov solvers, Gauge-link fattening.	Yes

* Indicates new application

OSIRIS	Simulates Plasma Physics including Laser interaction	2 dimensions of the particle push have been optimized with CUDA. Additional optimization is being planned with OpenACC.	Yes
PICongPU	A relativistic Particle-in-Cell code that describes the dynamics of a plasma by computing the motion of electrons and ions subject to the Maxwell-Vlasov equation.	Simulation of laser-wakefield acceleration of electrons.	Yes
PPM	Piecewise parabolic method, a higher-order extension of Godunov's method which uses spatial interpolation and allows for a steeper representation of discontinuities, particularly contact discontinuities.	Turbulent, compressible mixing of gases in the context of stars near the ends of their lives and also in inertial confinement fusion.	Single only
QUDA	Library for Lattice QCD calculations using GPUs.	CUDA supports the following fermion formulations: Wilson, Wilson-clover, Twisted mass, Improved staggered (asqtad or HISQ) and Domain wall.	Yes
RAMSES	Simulates astrophysical problems on different scales (e.g. star formation, galaxy dynamics, cosmological structure formation).	CUDA acceleration is applied for radiative transfer for reionization, and the hydrodynamic solver using AMR.	Yes
XGC	Simulates edge effects for MHD plasma physics	The particle push portion has been optimized with CUDA and is being fully optimized with OpenACC and CUDA.	Yes

SCIENTIFIC VISUALIZATION

APPLICATION	DESCRIPTION	SUPPORTED FEATURES	MULTI-GPU SUPPORT
3D Slicer	Medical visualization & segmentation	Rendering, image processing	Single only
CEI EnSight	Visualization and analysis application for CAE	Rendering	Yes
FluoRender (SCI, U of Utah)	Interactive rendering tool for confocal microscopy data visualization.	Multi-channel volume rendering	Single only
GPULib for IDL	Data analysis application	Analysis tasks	Single only
HVR (LCSE, U of Minnesota)	Interactive volume rendering application	Volume rendering	Yes
ImageVis3D (SCI, U of Utah)	Simple, scalable, and interactive volume rendering application.	Out-of-core volume rendering	Single only
IntelligentLight FieldView	Visualization application for CFD	Rendering	Single only
MathWorks - MATLAB	Data analysis and visualization application	Rendering and analysis tasks	Single only
ParaView	Scalable data analysis and visualization application	Rendering and analysis tasks	Yes
Seg3D (SCI, U of Utah)	Segmentation application for medical data	Rendering, image processing	Single only
Visualization Toolkit (VTK)	Data analysis and visualization toolkit	Rendering	Single only
VisIt	Scalable data analysis and visualization application	Rendering and analysis tasks	Yes
vl3 (Argonne National Lab)	Large dataset visualization in cosmology, astrophysics, and biosciences fields.	Volume rendering of particles	Yes
VMD (U of Illinois, Urbana-Champaign)	Visualization and analysis of large bio-molecular systems in 3-D graphics.	High-quality rendering, large structures (100M atoms), analysis and visualization tasks, multiple GPU support for display of molecular orbitals.	Yes

Safety & Security

APPLICATION	DESCRIPTION	SUPPORTED FEATURES	MULTI-GPU SUPPORT
* Cognika - Perseus	Real-Time Alerting and Visual Search for Fixed and PTZ Cameras	Real-Time alerting on humans or vehicles; Content-based image search on humans or vehicles	Yes
* Genetec – Security Center 5.3	GPU accelerated decode & rendering enables the display of more high-resolution streams from a single workstation, as well as enhancing video playback performance.	Offloads the workload of video stream decode and display rendering of multiple streams to GPU.	Single only
Herta Security - BioSurveillance NEXT, BioFinder	Real time facial recognition and forensic alerts against multiple watchlists.	Supports crowded scenes, difficult lighting, faster than real-time analysis, partial face concealment.	Yes
* iCetana - iMotionFocus	Intelligent analysis of video on 1,000+ camera streams to significantly filter and reduce the camera streams requiring an operator view.	GPU accelerated machine learning to identify abnormal activity within video streams	Yes
intuVision - intuVision VA	Real-time alerts and data reporting from use cases include Security, Traffic, Retail and Parking, Analysis of video streams in real-time and on archived video at up to 20x real-time speeds.	Robust and user trainable object classification for tracking. Using distributed architecture	Yes
* IQrity Inc. - IQrity RTFace -300/600, IQrity LDFace - 800	Deep Learning facial recognition SDK with 25 bytes template for real-time identification applications and large-scale IdM solutions	Real-time face detection, verification or suspect identification against multi-million datasets based on an artificial neural network	Yes
* Macroscop	Open-platform video management software for scalable IP video surveillance systems with advanced video analytics.	H264 decoding for CPU offload, zooming, image conversion shader from 24 to 32 bits delivering better color combination	Yes
Mi-AccLib	Accelerated library for video analysis on video surveillance.	Accelerated Intrusion Detection Algorithm.	Yes
MotionDSP - Ikena Forensic, Ikena Spotlight	Real-time (render-less) super-resolution-based video enhancement and redaction software for forensic analysts and law enforcement professionals	Multi-filter, render-less video reconstruction (super-resolution, stabilization, light/color correction), and automatic tracking for redaction video from body cameras, CCTV and other sources.	Yes
NEC NeoFace® Watch	Face recognition for real-time video surveillance and offline search compared against multiple watch-lists.	Detects & recognizes multiple faces simultaneously in crowds and variable lighting, scales to more cameras, larger face databases.	Yes
Nerve - Visual Search Solution (NVSS)	High speed visual search and analysis	Uses images instead of keywords to search for objects or scenes of interest within video and imagery. Reliant solely on pixel data with no training, keywords, or tags required.	Yes
* Network Optix - Nx Witness	IP video management system designed for auto discovering, managing, recording, analyzing and searching thousands of video streams at the same time	GPU accelerated conversion of YUV images to RGB, drawing and scaling YUV images in desktop client, dewarping fisheye (circular or panamorph) live or recorded video streams	Yes
* Smilart Platform	Real-time face recognition in cooperative and uncooperative scenarios adaptable for a multitude of applications to detect, identify or verify people and objects.	Critical core segments written in CUDA allowing for unlimited parallelization and transparent clustering.	Yes

For more information on GPU-accelerated applications please visit, www.nvidia.com/teslaapps

