



GPU-ACCELERATED APPLICATIONS



GPU-ACCELERATED APPLICATIONS

Accelerated computing has revolutionized a broad range of industries with over two hundred applications optimized for GPUs to help you accelerate your work.

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Computational Finance

APPLICATION	DESCRIPTION	SUPPORTED FEATURES	MULTI-GPU SUPPORT
Aaon 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
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	High Speed Multi-Algorithm Search Engine library providing high speed text string search with scalability of searching text and/or keywords on hundreds millions of records and/or text data.	Exact Text match Search, Approximate\ Similarity Text Search, Wild Card Text Search, Proximity & Percentage Text Search, MultiKeyword and MultiColumnMultiKeyword Text Search, RadixSort Text	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 Adaptiv 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's 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

Defense and Intelligence

APPLICATION	DESCRIPTION	SUPPORTED FEATURES	MULTI-GPU SUPPORT
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
Eternix Blaze Terra	Geospatial Visualization	3D visualization of geospatial data	Yes
Exelis (ITT) ENVI (also available as an ESRI ArcGIS extension)	Geospatial Visualization	Image orthorectification, Image transformation, atmospheric correction	Yes
GAIA	Multi-GPU, Multi-Machine distributed object store providing SQL style query capability, advanced geospatial query capability, heatmap generation, and distributed rasterization services	Built for GPUs, scales to many machines and many cards without end user query modification or pre-meditation	Yes
GeoWeb3d Desktop	Geospatial Visualization	3D visualization of geospatial data	Yes
Incogna GIS	Geospatial Visualization	Image processing on Tesla cloud servers Object recognition	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 and WAMI enhancement and analytics	Real-time super-resolution-based video enhancement, filtering, mosaicing, video analytics, and transcoding	Yes
MrGeo	Geospatial Visualization	Terrain analytics	Yes
Nervve ViD SrX	Video Analytics	Object recognition and tracking	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	Geospatial Visualization	Image orthorectification and additional image processing	Yes

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Manufacturing: CAD and CAE

COMPUTER AIDED DESIGN

APPLICATION	DESCRIPTION	SUPPORTED FEATURES	MULTI-GPU SUPPORT
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.	Single only
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 games, film, and motion graphics	3D modeling, mesh and surface modeling, improved Nitrous viewport performance, iray rendering	Yes
Bunkspeed Suite	Easy to use photorealistic rendering software	Iray-based ray-tracing. Animation support. Network rendering	Yes
Dassault Systemes CATIA	Accelerated UI rendering	Full OpenGL implementation including menus and dialog box	Single only
Inventor	3D mechanical design, documentation, and product simulation	Uses BIM for intelligent building components to improve design accuracy	Single only
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
PTC Creo Parametric	Parametric design solution suite	Anti-aliasing, better lighting and enhanced shaded-with-edges mode. GRID Support	Single only
Revit	Building Information Modeling (BIM) for structural engineering, and construction	Modeling (BIM) to design, build, and maintain higher-quality, more energy-efficient buildings	Single only
RTT 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
Siemens PLM 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 Client.	Single only

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
CPFD Barracuda-VR and Barracuda	Fluidized bed modeling software	Linear equation solver, particle calculations	Single only
FluiDyna Culises for OpenFOAM	Solver library for general purpose CFD software	Linear equation solvers	Yes
FluiDyna LBultra	General purpose CFD software	Lattice-Boltzmann solver	Yes
Promotech Particleworks	Particle-based CFD software	Implicit and explicit solvers	Single only
Turbostream Ltd.	CFD software for turbomachinery flows	Explicit solver	Yes
Vratis ARAEL	General purpose CFD software based on FVM with OpenFOAM compatibility	Linear equation solver	Yes
Vratis SpeedIT extreme 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
NASA FUN3D	General purpose CFD software	Linear equation solver	Single only
S3D(Sandia and Oak Ridge NL)	Direct numerical solver (DNS) for turbulent combustion	Chemistry model	Yes
SD++ (Stanford-Jameson)	General purpose CFD software for compressible flows.	Explicit solver	Yes

COMPUTATIONAL STRUCTURAL MECHANICS

APPLICATION	DESCRIPTION	SUPPORTED FEATURES	MULTI-GPU SUPPORT
Abaqus/Standard	Simulation and analysis tool for structural mechanics	Direct sparse solver	Yes
ANSYS Mechanical	Simulation and analysis tool for structural mechanics	Direct and iterative solvers	Yes
DS Exsight	Uses Abaqus Standard for GPU computing	Direct sparse solver	Single only
DS DesignSight	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	Linear equation solver	Yes
LS-DYNA Implicit	Multiphysics simulation package used	Linear equation solver	Yes
MSC Nastran	Simulation and analysis tool for structural mechanics	Direct sparse solver	Yes
MSC Marc	Simulation and analysis tool for structural mechanics	Direct sparse solver	Yes
NX Nastran	Simulation and analysis tool for structural mechanics	Linear equation solver	Single only
OptiStruct	Simulation and analysis tool for structural mechanics	Direct and iterative solvers	Yes
PAM-CRASH Implicit	Multiphysics simulation package used	Linear equation solver	Single only

ELECTRONIC DESIGN AUTOMATION

APPLICATION	DESCRIPTION	SUPPORTED FEATURES	MULTI-GPU SUPPORT
Agilent Technologies ADS	Simulation tool for design of RF, microwave and high speed digital circuits	Signal integrity simulation	Single only
Agilent Technologies EMPro	Modeling and simulation environment for analyzing 3D EM effects of high speed and RF/Microwave components	FDTD 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
ANSYS HFSS	Simulation tool for modeling 3-D full-wave electromagnetic fields in high-frequency and high-speed electronic components.	Transient solver	Yes
CST Microwave Studio (MWS)	3D EM modeling and simulation	Transient solver	Yes
Delcross Savant	Simulation tool for installed antenna performance and antenna-to-antenna coupling	High-frequency solver	Yes
EMSS FEKO	3D EM modeling and simulation	MoM solver	Single only
GAUDA OPC, OPV	GPGPU-based computational lithography acceleration technology	Optical proximity correction and verification	Single only
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

Remcom XFtdt	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
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
Cebas finalRender	GPU Renderer	CUDA-based GPU Rendering	Yes
CentiLeo GPU Render	GPU Renderer	CUDA-based GPU rendering	Single only
Chaos 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 Sculpttris	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

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
Assimilate Scratch	Color grading and finishing	Accelerated debayering for real-time digital finishing.	Single only
Blackmagic DaVinci Resolve	Color grading	Real-time color correction, real-time de-noising	Yes
Cinnafilm Dark Energy	Application and plug-in for image enhancement	Image de-noising and restoration. Simultaneous active and background rendering	Yes
Digital Vision Nucoda	Color grading	Real-time color correction	Single only
HS-ART DIAMANT-Film Restoration	Image restoration & enhance	CUDA based image processing and optical flow motion estimation	Yes
Marquise Technologies Rain	Color grading	CUDA-based real-time color correction	Single only
Quantel Pablo Rio	Color grading and finishing	Real time color correction	Yes
Red Digital Cinema REDCINE-X	Color grading	CUDA-accelerated debayering	Single only
SGO Mistika	Color grading and finishing	Real-time color correction and finishing	Single only
The Pixel Farm PFClean	Image restoration and remastering	CUDA-based image processing acceleration	Single only

COMPOSITING, FINISHING AND EFFECTS

APPLICATION	DESCRIPTION	SUPPORTED FEATURES	MULTI-GPU SUPPORT
ABSoft Neat Video	Video noise reduction plug-in	CUDA-based acceleration	Single only
Adobe After Effects CC	Motion graphics and effects	3D ray tracing engine based on NVIDIA OptiX	Yes
Autodesk Flame Premium	Finishing and color grading	Post-production integrated end-to-end toolset for 3D VFX, editorial, and color grading	Single Only
Autodesk Smoke	Finishing and editing	Faster effects	Single only
Boris FX Continuum Complete	Visual effects plug-in	Faster effects	Single only
Cinnafilm Dark Energy Plug-in	Color management	All features accelerated with CUDA	Yes
CoreMelt complete	Visual effects plug-in	Faster effects	Single only
eyeon Fusion	Effects and compositing	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
HS-ART DIAMANT-Film Restoration	Object removal and retouching	Exemplar based inpainting	Yes
Neat Video Open FX	Video noise reduction plug-in	Faster effects	Single only
NewBlueFX Video Essentials	Video effects plug-in	Faster effects	Single only
NewBlue Titler Pro	Video titling plug-in	Faster effects	Single only
Pixelan AnyFX	Video effects plug-in	Faster effects	Single only
Re:Vision Effects	Visual effects plug-in	Faster effects	Single only
Red Giant Effects Suite	Visual effects plug-ins	Faster effects	Single only
Red Giant Magic Bullet Looks	Color and finishing tools	Faster effects	Single only
ROBUSKEY	Chroma keyer plug-in	Faster effects	Single only
The Foundry HIERO	Shot management, conform and review timeline	Better interactivity	Single only
The Foundry NUKE and NUKEX	Compositing tools with 3D tracker	Faster effects	Single only
Video Copilot Software Element 3D	3D object based particle system	Faster effects	Yes
Video Copilot Optical Flares	Lens flares plug-in for After Effects	Faster effects	Single only
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
Avid Media Composer	Video editing	Faster video effects, unique stereo 3D capabilities	Single only
Grass Valley Edius	Video editing	Faster effects	Single only
Harris Velocity	Video editing	Faster effects	Single only
Quantel Qube	Broadcast video editing	Faster video effects, unique stereo 3D capabilities	Single only
Sony Vegas Pro	Video editing	Faster video effects and encoding	Single only
VidiCort	Video essence quality checking for production and preservation	Fast video quality detectors and motion estimation	Single only

ENCODING AND DIGITAL DISTRIBUTION

APPLICATION	DESCRIPTION	SUPPORTED FEATURES	MULTI-GPU SUPPORT
ArcVideo Core	Extremely fast and high efficient video processing and transcoding system, which targets to handling all kinds of file formats as inputs, decodes, edits and encodes them into popular delivery formats required by Broadcasting and TV, Internet Video streaming, Tele-Communication and Video security industry etc.	Broadcasting video transcoding. Utilizes NVIDIA CUDA and NVENC to accelerate video contents processing and transcoding	Yes
ArcVideo Live	High-density real time video processing and transcoding system, which targets to handling multiple real time sources and transcode them into various live streaming formats required by Broadcasting and TV, Internet Video streaming, Tele-Communication and Video security industry etc.	Broadcasting video transcoding. Utilizes NVIDIA CUDA and NVENC to process multiple real time video sources, and ensures highest quality especially delivering over internet with as low bitrate as possible.	Yes
Cinnafilm Tachyon	Standards conversion	Video encoding and video processing	Yes
Digimetrics Aurora	Automatd video and audio test and measurement	Video encoding and video processing	Single only
Elemental Live	Live streaming video processing and encoding	Video encoding and video processing	Yes
Elemental Server	File-based video processing and encoding	Video encoding and video processing	Yes
isovideo Viarte	Video standards conversion	CUDA-accelerated video proccession and encoding	Yes
MainConcept CUDA H.264/AVC Encoder SDK	H.264 video encoder	Video encoding and video processing	Yes
Snell Alchemist on Demand	Video standards conversion	Video proccession and encoding	Yes
Sorenson Squeeze	Video transcoding application and plug-In	Video encoding and video processing	Yes
Telestream Vantage	Video transcoding and processing	Video encoding and video processing	Yes

ON-AIR GRAPHICS

APPLICATION	DESCRIPTION	SUPPORTED FEATURES	MULTI-GPU SUPPORT
Avid On-air Graphics	Motion Graphics	Real-time rendering	Single only
Brainstorm Estudio	Virtual Sets and motion graphics	Real-time rendering	Single only
Chyron HyperX	On-air graphics	Real-time rendering	Single only
Chyron LEX	On-air graphics	Real-time rendering	Single only
Harris Insciber	On-air graphics	Real-time rendering	Single only
Monarch dScript 3D	Virtual sets	Real-time rendering	Single only
Monarch Twister Pro	Virtual Sets and motion 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	Real-time rendering	Single only
Wasp 3D Beehive	On-air graphics and virtual sets	Real-time rendering	Single only

ON-SET, REVIEW AND STEREO TOOLS

APPLICATION	DESCRIPTION	SUPPORTED FEATURES	MULTI-GPU SUPPORT
3ality Intellicam	3D stereo camera adjustment	CUDA-based imaging	Single only
BlueFish 4K Review	Review and approval of 4K content	Real-time	Single only
Colorfront On-Set Dailies	Review and approval of 4K content	Real-time	Yes
eyeon Dimension	3D stereoscopic workflow	Real-time	Single only
Lightcraft Previzion	On-set workflow	Real-time	Single only
Tweak RV	Review and approval of 4K content	Real-time	Single only

SIMULATION

APPLICATION	DESCRIPTION	SUPPORTED FEATURES	MULTI-GPU SUPPORT
3DAliens Glu3d	SPH fluid simulation	Faster simulation	Single only
Blastcode Kilton/ Megaton	Physics-based simulation plug in	Faster simulation	Single only
Jawset TurbulenceFD	Physics-based simulation plug in	Faster simulation	Single only

WEATHER GRAPHICS

APPLICATION	DESCRIPTION	SUPPORTED FEATURES	MULTI-GPU SUPPORT
Accuweather Cinematic HD	Weather graphics	Real-time	Single only
Accuweather Storyteller	Weather graphics	Real-time	Single only
Meteo Earth	Weather graphics	Real-time	Single only
Weather Central Fusion Studio	Weather graphics	Real-time	Single only
WSI TrueView Max	Weather graphics	Real-time	Single only

Oil and Gas

APPLICATION	DESCRIPTION	SUPPORTED FEATURES	MULTI-GPU SUPPORT
Acceleware AxRTM AxKTM	Seismic Processing	RTM, Kirchhoff, control source, electromagnetism, forward modeling	Yes
CGGV GeoVation	Seismic Processing	Multiple algorithms (RTM, etc)	Yes
CGG-Veritas Inside Earth	Seismic Interpretation	Horizon orientation attributes; automated fault extraction, Curvature Attributes	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 imaging	Pre-stack analysis, time migration, velocity model	Yes
GeoStar Seismic Suite	Seismic Processing	Multiple algorithms (RTM, etc)	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
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
Panorama Tech	Seismic Processing, Modeling	Multiple algorithms (RTM, etc)	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
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
BarraCUDA	Sequence mapping software	Alignment of short sequencing reads, alignment of indels with gap openings and extensions	Yes
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	Opensource 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

Materials Science

APPLICATION	DESCRIPTION	SUPPORTED FEATURES	MULTI-GPU SUPPORT
gWL-LSMS	Materials code for investigating the effects of temperature on magnetism	Generalized Wang-Landau method	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
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
VASP	First principles materials code that computes the behavior of electronic structures based on quantum theory	Blocked Davidson and RMM-DIIS iterative solvers (ALGO=NORMAL, FAST, & VERYFAST), as well as hybrid Hartree-Fock DFT functionals including exact exchange	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	PMEMD Explicit Solvent and GB Implicit Solvent	Yes
CHARMM	MD package to simulate molecular dynamics on biomolecule	Implicit (5x), Explicit (2x) Solvent via OpenMM	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
DL-POLY	Simulate macromolecules, polymers, ionic systems, etc on a distributed memory parallel computer	Two-body forces, Link-cell pairs, Ewald SPME forces, Shake VV	Yes
ESPResSo	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
HOOMD-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
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

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
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
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/ss) 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
LATTE	Density matrix computations	CU_BLAS, SP2 Algorithm	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
MOPAC2013	Semiempirical Quantum Chemistry	Pseudodiagonalization, full diagonalization, and density matrix assembling	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
Q-CHEM	Computational chemistry package designed for HPC clusters	Various features including RI-MP2	TBD
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

Visualization and Docking

APPLICATION	DESCRIPTION	SUPPORTED FEATURES	MULTI-GPU SUPPORT
Amira 5	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
Core Hopping	Rapid screening of novel cores to improve drug properties	GPU accelerated application	Yes
FastROCS	Molecule shape comparison application	Real-time shape similarity searching/ comparison	Yes
Interactive Molecule Visualizer	Molecular visualization based on a ray-tracing engine	Written for use only on GPUs	Yes
Molegro Virtual Docker 6	Method for performing high accuracy flexible molecular docking	Energy grid computation, pose evaluation and guided differential evolution	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
ArrayFire	Comprehensive GPU function library	Hundreds of functions for math, signal/ image processing, statistics, and more.	Yes
Mathematica Wolfram	A symbolic technical computing language and development environment	Development environment for CUDA and OpenCL	Yes
MATLAB by Mathworks	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
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
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
GTS	Simulates microturbulence and the motion of charged particles and interactions in fusion plasma	Push and shift for both electron and ion dynamics	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
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
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

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

