

APPENDIX A: ACRONYMS AND ABBREVIATIONS

°C	degrees centigrade
°F	degrees Fahrenheit
µm	micrometer (micron)
2D	two-dimensional
2DTBC	two-dimensionally triaxially-braided composite
3D	three-dimensional
3DAP	three-dimensional atom probe
3-DEP	Three Dimensional Engineered Preform
A/SP	Auto/Steel Partnership
ABS	acrylonitrile-butadiene-styrene
ACC	Automotive Composites Consortium
ACC-PD	American Chemistry Council, Plastics Division
ACCU	ACC Underbody
AEL	arbitrary Eulerian lagrangian
AFM	atomic-force microscope (microscopy)
AFR	amplified frequency ratio
AFS	American Foundry Society
AHSS	advanced high-strength steel
AISI	American Iron and Steel Institute
AJAX	Asynchronous JavaScript and XML
Al	aluminum
ALMR	arbitrary local mesh replacement
AMD	Automotive Metals Division (of USAMP)
ANL	Argonne National Laboratory
ANOVA	analysis of variance
ANSI	American National Standard Institute
AP	acidification potential
APC	American Plastics Council
API	application program interface
APS	Advanced Photon Source
ARA	Automotive Recycling Association
ARC	(International) Automobile Recycling Congress
ARD	anisotropic rotary diffusion
ARL	Army Research Laboratory
ASTM	American Society for Testing and Materials
ATR-FTIR	attenuated total reflectance Fourier transform infrared (spectroscopy)
AWS	American Welding Society
bcc	body-centered cubic
BCJ	Bammann-Chiesa-Johnson
BDE	brominated diphenyl ethers
BE	blended element
BET	Brunauer-Emmett-Teller
BH	bake hardenable

BIW	body-in-white
BL	black liquor
BLRT	bondline read-through
BOF	body-on-frame
BPEL	Business Process Execution Language
BSEF	Bromine Science and Environmental Forum
CAD	computer-aided design/drafting
CAE	computer-aided engineering
CAFE	corporate average fuel economy
CANMET	The major laboratory of Minerals and Metals Section of Natural Resources Canada
CAVS	Center for Advanced Vehicular Systems
CB	cylinder block
cc	cubic centimeter
CC	continuous-cast(ing)
CCT	continuous cooling transformation
CD	compact disc
CDF	cumulative distribution function
CDC	channel die compression
CF	carbon fiber
CFM	continuous-filament mats
CG	conjugate gradient
CLTE	coefficient of linear thermal expansion
cm	centimeter
CNC	computerized numerical control
CNF	carbon nanofibers
CO ₂	carbon dioxide
COE	coefficient of expansion
COM	Conference of Metallurgists
COV	coefficient of variation
CP	commercial purity, complex phase
CPMT	Center for Powder Metallurgy
CPU	central processing unit
CRADA	cooperative research and development agreement
CSM	Composite Spray Molding, Colorado School of Mines
CT	computed tomography, cross-tension
CTE	coefficient of thermal expansion
CVDM	Center for Virtual Design and Manufacturing
CWL	cell-wall loading
CWT	Changing World Technologies
DACE	design and analysis of computer experiments
DAIS	direct-access interface system
DAS	data-acquisition system
DAW	drawn-arc welding
DBMS	Database Management System
DC	direct chill, direct current, die-cast

DFL	dry-film lubricant
DFT	density functional theory
DIC	digital imaging correlation
DLFT	direct long-fiber thermoplastic
DMA	dynamic mechanical analysis, analyzer
DOE	Department of Energy
DoE	design of experiment
DoF	degree(s) of freedom
DP	dual phase
DQ	drawing quality
DQSK	drawing-quality special-killed
DR	dimension reduction
DRIFT [®]	Direct Reinforced(ment) Fabrication Technology
DS	driver seat
DSC	differential scanning calorimeter, calorimetry
DTA	differential thermal (thermogravimetric) analysis, analyzer
DTUL	deflection temperature under load
E	Young's modulus (of elasticity)
EAM	embedded-atom method
EB	electron beam
EBSD	electron backscatter diffraction
ECD	electron capture detector
EDS	energy dispersive spectra
EDX	energy-dispersive x-ray
EG	electro-galvanized
EGLD	extended generalized lambda distribution
EH&S	environmental, health and safety
EIFS	equivalent initial flaw size
ELV	end-of-life vehicle(s)
EMF	electromagnetic forming
EMT	Eshelby-Mori-Tanaka
EMTA	Eshelby-Mori-Tanaka approach
EP	eutrophication potential
EPA	Environmental Protection Agency
EPFL	Ecole Polytechnic Federal de Lausanne, Swiss Federal Institute of Technology
EPFM	elastic-plastic fracture mechanics
EPR	endpoint reference
ERW	electric resistance welding
ESB	enterprise service bus
EVO	engineering virtual organization
FAME	Flexible Advanced Metamodeling Estimator
fcc	face-centered cubic
FCVT	FreedomCAR Vehicle Technologies
FE	finite element
FEA	finite-element analysis

FEC	front-engine cover
FEFRAC	finite-element fracture
FEG-SEM	field-emission gun scanning electron microscope (microscopy)
FEM	finite-element modeling
FESEM	field-emission scanning electron microscope (microscopy)
FFNN	feed-forward neural network
FFI	full-frontal impact
FGPC	Future Generation Passenger Compartment
FHWA	Federal Highway Administration
FLCA	front-left control arm
FLD	fiber length distribution
FLD	forming-limit diagram
FMEAM	force-matching embedded-atom method
FMVSS	Federal Motor Vehicle Safety Standard
FOD	fiber-orientation distribution
FOTS	first-order Taylor series
FP	Focal Project
FRP	fiber-reinforced plastic
FSP	fiber saturation point
FSW	friction-stir welded, -ing
FSSW	friction-stir spot welding
FTC	Federal Trade Commission
FTIR	Fourier transform infrared
FVF	fiber volume fraction
FWHM	full-width at half maximum
FY	fiscal year

g	gram
GaBi	Ganzheitliche Bilanzierung software
GBD	generalized beta distribution
GC	gas chromatography
GC-ECD	gas chromatography – electron-capture detector
GC-MS	gas chromatograph(y)-mass spectrometer(ry)
GE	General Electric
GGA	generalized gradient approximation
GLD	generalized lambda distribution
GM	General Motors Corporation
GMAS	Group Membership Authorization Service
GMAW	gas metal arc welding
GMSE	generalized mean square error
GND	geometrically necessary dislocation
GP	Guinier-Preston, Gaussian process
GPEC	Global Plastics Environmental Conference
GRAM	grid resource allocation management
gridFTP	grid file transfer protocol
GT4	Global Toolkit 4
GUI	graphical user interface
GWP	global-warning potential

h	hour
H	hydrogen
HAZ	heat-affected zone
HBA	hydroxybenzoic acid
HCF	high-cycle fatigue
hcp	hexagonal close-packed
HDG	heavy duty galvanized, hot-dip galvanized (galvanized)
HDH	hydride-dehydride
HDPE	high-density polyethylene
HDPE	high-density polyethylene
HEXRD	high-energy x-ray diffraction
HFVFSI	High Fiber Volume Fraction Sequential Inclusion
HI-MAC	high-integrity magnesium automotive castings
HiMECC	Hierarchical, Micro Experimental and Computational Characterization
HIPing	hot isostatic pressing
HIPS	high-impact polystyrene
HMPP	high-modulus polypropylene
HNA	hydroxynaphthoic acid.
HPDC	high-pressure die casting
HPLC	high-performance liquid chromatography
HSB	hot-stamped boron
HSBS	hot-stamped boron steel(s)
HSLA	high-strength low-alloy
HSS	high-strength steel
HTML	High-Temperature Materials Laboratory
HTTP	hypertext transfer protocol
IA	indentation area
IABC	International Automotive Body Congress
IAFR	integrated amplified-frequency ratio
ICME	Integrated Computational Materials Engineering
ICP/MS	induction-coupled plasma/mass spectroscopy
ID	indentation depth, inner diameter
IDDRG	International Deep Drawing Research Group
IF	interstitial-free
IIHS	Insurance Institute for Highway Safety
IISI	International Iron & Steel Institute
IMR	Institute for Metal Research
in.	inch
I/O	input/output
IP	intellectual property
IR	infrared
ISRI	Institute of Scrap Recycling Industries
ISV	internal state variable
IT	information technologies
ITP	International Titanium Powder

J2EE	Java 2 Platform, Enterprise Edition
JB1	Java Business Integration
JCI	Johnson Controls, Inc
JD	Job Descriptor
JMS	Java Message Service, Job Metadata Service, job monitoring service
jpm	jobs per minute
JSDL	Job Submission Description Language
JSS	job status service, Job Submission Service
KBFB	kenaf-bast-fiber bundles
KR	Kriging
Ksi	thousand pounds per square inch
lb	pound
LBNL	Lawrence Berkeley National Laboratory
LC	long crack
LCF	low-cycle fatigue
LDA	local-density approximation
LDH	limited-dome-height
LDPE	low-density polyethylene
LEAP	local-electrode atom probe
LFI	long fiber injection
LFI-PUR	Long Fiber Injection - Polyurethane
LFT	long-fiber thermoplastics
LHS	Latin Hypercube Sampling
LM	lightweighting materials
LRDV	large rear-drive vehicle
LS	lap-shear
LSTC	Livermore Software Technology Corporation
LSEM	large-strain extrusion machining
LTC	large thin casting
LU	laser ultrasonics
LW	laser-welded
LWFS	Lightweight Front Structure
MAG	microwave-assisted gasification
MAP	microwave-assisted plasma
MBC	main bearing cap
MC	moisture content
MC	Monte Carlo
MCS	Monte-Carlo simulations
MD	molecular dynamics
MDS	Multi-scale Design System
MEAM	modified embedded-atom method
MENA	Magnesium Elektron of North America
MFE	Magnesium Front End
MFEDD	Magnesium Front End Design and Development
MFERD	Magnesium Front End Research and Development

MFG	Molded Fiber Glass Companies
MFR	melt flow rate
Mg	magnesium
MHz	mega Hertz
MI	melt index
MIG	metal inert gas
min	minute
M-K	Marciniak-Kuczynski
mm	millimeter
MMI	Michigan Molecular Institute
MMV	Multi-Materials Vehicle
MOE	modulus of elasticity
MOO	multi-objective optimization
MOR	modulus of rupture
MPCC	Magnesium Powertrain Cast Components
MPIF	Metal Powder Industries Federation
MPS	material and process system
MRI	Magnesium Research Institute
MS	mass spectroscopy, characterized length scale of interaction with microstructural Features, martensitic steels, Master of Science
MSC	microstructurally small crack
MSF	multistage fatigue
MSST	Mississippi State University
MS&T	Materials Science and Technology
MTL	Materials Technology Laboratory
MWV	MeadWestvaco
N/D or N.D.	not detected
NA	numerical aperture
NADCA	North American Die Casting Association
NASA	National Aeronautics and Space Administration
NC	numerical control, neighborhood compliance
NCAP	New Car Assessment Program
NCC	National Composite Center
NDE	nondestructive evaluation
NDI	nondestructive inspection
NDT	nondestructive testing
NEXAFS	near-edge x-ray absorption fine structure (spectroscopy)
NFC	natural-fiber composite
NHTSA	National Highway Transportation Safety Administration
NIST	National Institute for Standards and Technology
NIT	nanindentation test
NIR	near infrared
NOx	nitrogen oxides
NPC	natural-fiber polymer (polyolefin) composite
NTRC	National Transportation Research Center
NUCAPT	Northwestern University Center for Atom Probe Tomography
NVH	noise, vibration and harshness

OD	outside diameter
ODB	oven-dry-base
ODB	oven-dry-basis, Offset Deformable Barrier
OEM	original equipment manufacturer
OFAT	one-factor-at-a-time
OFI	offset frontal impact
OGSA	Open Grid Services Architecture
OGSA-DAI	Open Grid Services Architecture Data Access and Integration
OM	optical microscope/microscopy
ORNL	Oak Ridge National Laboratory
OSU	Ohio State University
P4	Programmable Powdered Preform Process
PA	phased-array, prealloyed
PAH	polycyclic aromatic hydrocarbon
PAN	polyacrylonitrile
PAW	projector augmented wave
PBDEs	polybrominated diphenyl ethers
PBS	portable batch system
PC	polycarbonate
PCBN	polycrystalline cubic boron nitride
PCBs	polychlorinated biphenyls
PDF	probability distribution function
PE	polyethylene
PET	polyethylene terephthalate
PFOA	perfluorooctanoic acid
PFOS	perfluorooctanesulfonates
PIM	powder injection molding, Powder Impression Molding
PM	permanent mold; powder metal, metallurgy
P/M	powder metal, metallurgy
PNGV	Partnership for a New Generation of Vehicles
PNNL	Pacific Northwest National Laboratory
POCP	photochemical ozone creation potential
PP	polypropylene
PP/PE	polypropylene/polyethylene
PPM	parts per million
PPO	polyphenylene oxide
PR	polynomial regression
PS	polystyrene
PSC	Project Steering Committee, physically small crack
psi	pound force per square inch
PSP	processing-structure-property
PTC	Project Technical Committee, project technical coordinator
PTFE	polytetrafluoroethylene
PU	polyurethane
PVC	polyvinyl chloride
QRM	quarterly review meeting

R	stress ratio
R&D	research and development
R&R	repeatability and reproducibility
RaFC	random-fiber composite
RBDO	reliability-based design optimization
RBF	radial basis function
RD	rolling direction
RFQ	request for quote
RH	relative humidity
RMS	root mean square
RMSE	root mean square error
rpm	revolutions/rotations per minute
RS	response surface
RSA	Random Sequential Adsorption
RSC	rear-seal carrier
RSC	reduced strain closure
RSL	RAISE specification language
RSM	response service methodology
RSW	resistance spot weld(ing)
RVE	representative volume element
RWD	rear-wheel drive
SAE	Society of Automotive Engineers
SAML	Security Assertion Markup Language
SBIR	Small Business Innovative Research
Sc	simple cubic
SCC	stress-corrosion cracking
SCMD	Structural Cast Magnesium Development
SD	standard deviation
SDAS	secondary dendrite-arm spacing
SEA	specific energy absorption
Seagull®	a trademark of Herrick Scientific products, Inc.
SEL	solvent extracted lignins
SEM	scanning electron microscope/microscopy
SF ₆	sulfur hexafluoride
SG	specific gravity
Sh	rolled sheet per plate
SIR	seat with integrated restraint
SLC	Sub-Liquidus Casting
SLI	starting, lighting, ignition
SMC	sheet molding compound
SO ₂	sulfur dioxide
SOA	service-oriented architecture
SOAP	simple object access protocol
SOCs	substances of concern
SOP	structural oil pan, standard operating procedure
SOPO	Statement of Program Objectives
SORPAS	Simulation and Optimization of Resistance, Projection and Spot Welding Processes

SOW	statement of work
SPARC	Strategic Planning and Review Committee
SPBK	support bracket
SPE	Society of Plastics Engineers
SPD	severe plastic deformation
SPR	self-piercing rivet
SQL	structured query language
SRB	Storage Resource Broker
SRCLID	Southern Regional Center for Lightweight Innovative Design
SRIM	structural reaction injection molding
STD	standard seat (without integrated restraint, cf. "SIR" above)
STTR	Small Business Technology Transfer
SUV	sport-utility vehicle
SVDC	Super Vacuum Die Casting
SVR	support vector regression
SWE	Spot Weld Element
SWSG	Structural Weld Sub-Group
T	temperature
TA	transmission area
TAPPI	(previously "the Technical Association of the Pulp and Paper Industry, now just "TAPPI")
TC	transcrystalline region
TD	transverse to rolling direction
TE	thermoelectric
TEM	transmission electron microscope, microscopy
Tg	glass transition temperature
TGA	thermogravimetric analysis, analyzer
ThD	thermal drilling
Ti	titanium
TLCP	thermotropic liquid-crystal polymer
TMAC	Test Machine for Automotive Crashworthiness
TMP	thermo-mechanical pump, processing
TMS	The Minerals, Metals, and Materials Society
TPI	Troy Polymers, Inc.
TPO	thermoplastic olefins
TRC-NCMS	Technologies Research Corporation of the National Center for Manufacturing Sciences
TRIP	transformation-induced plasticity
TRS	transverse rupture strength
TS	tensile strength, thick swelling
TTU	through-transmission ultrasonics
TWB	tailor-welded blank
TWIP	twinning-induced plasticity
TWT	tailor-welded tube
TYE	tensile, yield and elongation

UAB	University of Alabama-Birmingham
UD	unidirectional
UDRDF	uncertainty analysis using dimension reduction and distribution fitting
UDRI	University of Dayton Research Institute
UFG	ultrafine grain
UHMW	ultra-high molecular weight
UHSS	ultra high-strength steel
ULC	ultra-large casting
UMF	uncertainty magnification factor
UPC	uncertainty percentage contribution
UPE	Unsaturated Polyester
URI	uniform resource identifier
URL	uniform resource locator
USAMP	United States Automotive Materials Partnership
USCAR	United States Council for Automotive Research
USPTO	United States Patent Office
UTS	ultimate tensile strength
UT-TT	ultrasonic testing using through-transmission
UV	ultraviolet
UVA	University of Virginia
V&V	verification and validation
VARTM	vacuum-assisted resin-transfer molding
VE	vinylester
VOMS	Virtual Organization Membership Service
VPA	volume per annum
VRP	Vehicle Recycling Partnership
VTP	Vehicle Technologies Program
VW	Volkswagen
WA	water absorption
W/L	ratio of specimen width to length
WPC	woodfiber-reinforced polymer composites
WRC	woodfiber-reinforced composites
WSDL	Web Service Definition/ Description Language
WY	Weyerhaeuser Company
X-EDS	x-ray-electron diffraction spectroscopy, spectrometry, spectrometer
XML	eXtensible Markup Language
XPS	x-ray photoelectron spectroscopy, (-meter) (-metry)
XRD	x-ray diffraction
XRS	x-ray photoelectron spectroscopy
YAG	yttrium-aluminum-garnet
YE	year-end
YS	yield strength