

# Michael Bobak

Knowledge-Engineer / Research-Programmer

[mike.bobak@gmail.com](mailto:mike.bobak@gmail.com) | [mike.bobak.googlepages.com](http://mike.bobak.googlepages.com) | [linkedin.com/in/michaelbobak](https://www.linkedin.com/in/michaelbobak) | Champaign, IL | Tweets: [@MBstream](https://twitter.com/MBstream)

## SUMMARY

[Research-Programmer](#) starting with (bio)[physical-science](#) simulation, adding AI study and years of [Knowledge-Engineering](#) work as well ([edu.gov/com](http://edu.gov/com)).

Focus on [Knowledge-Based](#) aids, for process improvement to [teaching](#). AI: [Knowledge-Representation and Reasoning](#), [Rules](#), [Kn-Acq](#), [NLP](#), [ML](#), ...

## SKILLS & EXPERTISE

AI [Artificial Intelligence](#) [Adaptive Systems](#) [Business Rules](#) [Case-Based Reasoning](#) [Conceptual Modeling](#) [Data Mining](#)

[Intelligent Agents](#) [Intelligent Systems](#) [Knowledge Engineering](#) [Knowledge-based Systems](#) [Machine Learning](#) [Natural Language Processing](#)

[Natural Language Understanding](#) [Ontology Engineering](#) [Rules](#) [Semantic Web](#) [Semantics](#) [Causal Inference](#) [Case-Based Reasoning](#)

[Composite Applications](#) [Computational Intelligence](#) [Controlled Vocabularies](#) [Data Analysis](#) [Decision Modeling](#) [Expert Systems](#) [Information Access](#)

[Information Extraction](#) [Information Retrieval](#) [Intelligent Tutoring Systems](#) [Knowledge Representation](#) [Logic Programming](#) [Mathematical Logic](#)

[Mathematical Programming](#) [Model-based reasoning](#) [Ontology Development](#) [Rules Engines](#) [SNOMED](#) [Semantic Search](#) [Semantic Technologies](#)

[Taxonomy Development](#) [Text Classification](#)

Science [Research](#) [Scientific Software](#) [Scientific Computing](#) [Scientific Visualization](#) [Simulation](#) [Computational Mathematics](#)

[Biophysics](#) [Computational Biology](#) [Physics](#)

Others [Cloud Computing](#) [MapReduce](#) [Hadoop](#) [Dynamic Languages](#) [Exploratory programming](#) [Common Lisp](#) [other Languages](#)

## WORK EXPERIENCE

Present **National Center for Supercomputing Applications** Urbana, IL

Nov 2019 [Sr Research Software Engineer](#)

Bringing my background to [earthcube.org](http://earthcube.org) and other grants as need be. Focus on semantics/metadata search, with some NLP and sim.

Aug 2019 **Agribile/Nutrien** Urbana, IL

Aug 2018 [Sr Engineer, Natural Systems](#)

Ag-informatics/sim/.. Planned and guided reworking the main simulation, documentation and ML/verification

Present **AlohaHealth** Urbana, IL

Jun 2018 [Sr Knowledge-Engineer](#)

Advising early stage startup built on the topic of my ucsf research. Semantic search for clinical trials.

Jul 2018 **Freelance** San-Francisco, CA

Jul 2011 [consultant](#)

- Working as an ontologist for osthus.com on aligning bio/pharma ontologies to BFO to annotate masses of data in HDF5 files, for the [allotrope.org](http://allotrope.org)
- Worked with IDEO on their systems integration issues that could be aided by Knowledge-Graph for information refinement and cleanup
- Worked with the Siemens Web of Things research group on use of SemWeb+IoT for adaptable manufacturing
- Advised with a variety of start-ups in understanding AI tech, including:
  - Fashion start-up that would track unstructured blog info to surface trends
  - Sports startup thewhytehousegroup.com needed dbpedia search ability

- Chatbot in work context
- Developed ideas to take my UCSF research and fuse it with the Patient Data Mining Cluster that was developed by the UCSF Head of Research Computing and a PhD student, which has now been submitted for a patent
- Worked with UCSF in Psychology Department understand how to apply NLP and graph relation insights into an app they developed called Prime, which has been designed for schizophrenic young adults, with application to depression management as well
- Continued to build skills around ML, Semantic-Web/Linked-Data, and Knowledge-Engineering:
  - Coursera courses: Data Analysis, Data Science (with distinction), Machine Learning (with distinction), Discrete Optimization (audit)
  - openHPI courses: Semantic Web, Knowledge Engineering, Kn Eng w/Semantic Web technology, LinkedDataEng
  - Stanford courses: Design Thinking

Jul 2011 **ApolloGrp.edu** *San-Francisco, CA*

Oct 2010 Architect , Adaptive Learning Platform

Conceptually annotate study material & tests for automated remediation, instrument classroom to learn from use [Hadoop, Lisp, KM]

Oct 2010 **UCSF.edu** *San-Francisco, CA*

Sep 2007 Programmer/Analyst III

Medical-Informatics [research](#) (relating to clinical-trials) in Lisp/KM, and Natural-Language-Processing in Java/etc; [paper](#) with Stanford [group](#); [ontology](#) dev/use [Lisp, KM, ..]

Sep 2007 **Freelance** *Chicago/Boston*

Feb 2001 Knowledge-Engineer/ Research-Programmer

[mindbox.com](#) 3/02-10/02. [used Art\*Enterprise] See: [Ocwen\\_Mindbox](#) Worked up to half-time for [cas.dis.anl.gov](#) 5/03-5/04 [Java Simulation] Worked full-time 8/03-~05([verizon](#))[labs.gte.com](#), Model-Based-Diagnosis on a national scale. [Art \*Enterprise] See: [aaai.org/Papers/IAAI/1996/IAAI96-287.pdf](#) Bioinformatics/control [contract](#) 11/04-12/05 [CLIPS&Protege.stanford.edu/Java/DB] Control of perfusion pumps on light microscope sample, monitoring incl. Machine-vision, Bio-ontology/reasoning/Kn-mngt for the experiment setup. & Grant proposal work. Worked for CME.com 2/06-06/06 (re)organizing trade-data validation code. [CLIPS/Jess] Signal-Processing/Machine-Learning (startup) 06/06-[Lisp/etc] Hospital Informatics/Machine-Learning ghx.com 02/07-05/07-[Lisp], MachineLearning speedup for financial-scientific [Lisp]

Feb 2001 **kbs.ai.UIUC.edu** *Urbana, IL*

Jun 1998 (Senior) Research Programmer ([Knowledge Based Systems Lab](#))

University of Illinois Urbana-Champaign, IL Organize many levels of a very large knowledge based simulation projects. Brought over 18 programmers together to deliver a coherent product. Ran weekly (sub)group meetings, down to help solving any problem. Hiring, demo, design, install trips, prototyping to lead project direction. Taught group of 6 how to use a Rule-Based-shell for a reasoner-rewrite in Art\*Enterprise. Projects included: Simulation-based, Intelligent Tutoring System (ITS) & Real-Time control system. Being used in classroom, real life testing, presented at IAAI99 'Automated Instructor Assistant for Ship Damage Control' The system teaches Navy officers how to save a simulated ship in crisis. A variant was developed to catch real-time crisis conditions and suggest solutions [www.dwilkins.org/members.htm](#)

Jun 1998 **Brightware** *out of Chicago, IL*

Oct 1996 Knowledge-Engineer

Helped develop and install their very first product (Intelligent email reply). Worked between development and consulting. Helped on several Knowledge-Based business applications. Helped with several deployed Knowledge-Based business applications (ie. financial: mortgage, web based job finder). [Art\*Enterprise]See: [http://www.brightware.com/eservice\\_solutions/](http://www.brightware.com/eservice_solutions/) More recently I worked 1/2year for the new version of the company: Mindbox.

Aug 1996 **Institute of Learning Sciences** *Evanston, IL*

Feb 1996 Lead Programmer/Analyst

Wrote Lisp code (mainly GUI) for Qualitative Research Group. Learned more about Qualitative/Quantitative Simulation, Model-Based Reasoning, Intelligent-Tutoring-Systems, & general Lisp programming. See: <http://www.qrg.northwestern.edu/projects/NSF/Cyclepad/abouttcp.htm>

Feb 1996 **Argonne National Lab** *Argonne, IL*

Feb 1993	Software Engineer ( <a href="#">EAD</a> then <a href="#">DIS</a> groups)
	Wrote fielded Expert System by myself at the end of grad-school. [in Lisp rule-shell then CLIPS] Prototyped communication & control of distributed simulation. [in CLIPS PVM etc] Agent wrapping of simulations with CLIPS+PVM, to describe then mix and match them. Also used C++/Smalltalk/FORTRAN with PVM; Other work as needed. Algo/Viz/Etc. Written up in a book about innovative distributed object application. See: <a href="http://www.dis.anl.gov/DEEM_HLAsim">http://www.dis.anl.gov/DEEM_HLAsim</a> <a href="http://www.dis.anl.gov/DEEM/DIAS_mike.bobak.googlepages.com/diaswp.pdf">http://www.dis.anl.gov/DEEM/DIAS_mike.bobak.googlepages.com/diaswp.pdf</a> _More recently I worked part-time for the new subgroup of dis: <a href="http://cas.dis.anl.gov">cas.dis.anl.gov</a> .
Jan 1993	<b>UIUC.edu</b> <i>Urbana, IL</i>
Jan 1990	Graduate Research Assistant /Research Programmer
	Wrote molecular graphics package used in classes & for publications. [in C] Used machine-learning techniques for protein structure prediction. Wrote thesis on Knowledge-Based Simulation Environment. [Lisp/OPS5/C] Overseen by heads of the NCSA CompBio group and head of Biophysics at the time. see: <a href="http://web.bilkent.edu.tr/ncsa/Apps/CBdir.html">web.bilkent.edu.tr/ncsa/Apps/CBdir.html</a>
Dec 1989	<b>[National Center for Supercomputing Applications]NCSA,Uof IL,GIST</b> <i>Urbana/Savoy, IL</i>
Apr 1989	Programmer/Consultant
	Suggested scientific software path for Software Tools Group of NCSA; Wrote molecular viz code for a professor. Wrote testing code for Global Info Systems Tech. [in C]
Apr 1989	<b>Shearson Lehman Hutton</b> <i>London, England</i>
Oct 1988	Programmer (Research Computing)
	Maintained financial databases & daily report information. Organized worldwide mailing system. Wrote statistics code for stock predictions. [MUMPS and Maths-package]
Aug 1988	<b>US Army Corp. of Eng. Research Lab</b> <i>Champaign, IL</i>
Mar 1982	Research Programmer (Modeling then Acoustics teams)
	Provided research support from start to finish. [FORTRAN] Wrote and ran computer simulation code, compared output with field data. Did field measurements to back up predictions. (Team/Self; Local/US/World-wide) My work went into several <a href="#">published papers</a> . GRASS: <a href="http://grass.fbk.eu">grass.fbk.eu</a>

## EDUCATION

### University of Illinois, Urbana-Champaign

MS Biophysics & Computational Biology with AI, 1990-93

BS Physics, BS Biophysics, 1983-88, dept. distinction

## PROFESSIONAL ORGANIZATIONS:

[AAAI \(Association for the Advancement of Artificial Intelligence\)](#) life-member.  
[IEEE \(Institute of Electrical and Electronics Engineers\)& Computer Society](#) 10yrs  
also: [meetup.com](#), [linkedin-groups](#), & [github opensource examples](#)

## PROGRAMMING LANGUAGES/...:

<u>19+ years overall</u>	<u>Object Orientated</u>	<u>Rule-Based</u>	<u>KnRep&amp;</u>	<u>Reasoning:</u>	<u>Libs:</u>	<u>Databases:</u>	<u>Operating-Systems:</u>
	[14+ years]			[10+ years]:			
C(6+ years)	Smalltalk (~1 yr)	C++	OPS5, Prolog,		Viz: OpenGL(3+ yrs)	MS-Jet/SQL, MySQL	NeXTSTEP, MS(NT..XP) (8+ yrs)
FORTRAN(6+ yrs)	(1+yr)		GoldWorks(<1yr)				
Scheme (~1 yr)	MUMPS (1/2yr)..	Python(5+yrs),	CLIPS(4+yrs),	ART(4+years)	HPC: PVM (1+yr)	PostgreSQL, ORDB	UNIX (18+ years),
		Java/Scala (1+ yr)					incl. <a href="#">GNULinux</a>
Lisp (7+yrs of CL	10+yrs	CLOS [CL -Object-	Knowledge-		WS:Tomcat/Axis SOAP/REST	Graph&triple	OS-X.Darwin(10+ years)
of others)	System]		Machine(3+years),	JESS(1 yr),		persistence	
			Protege(6+yrs)			&other	NoSQL

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