

Our nL dispenser. Sold direct.



Clients + our device & IP. Sold OEM.

Nanoliter LLC
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USA
nanoliter.com

Opportunity

Research labs, others seek a robust economical device for low volume dispensing.

Applications include proteomics, genomics, *iomics, forensics, clinical chemistry, DNA & more.

Desirable attributes of dispensing technology include:

Low, accurate volume - saves money, enables new capabilities.

Positional accuracy – higher density assay plates, more efficient

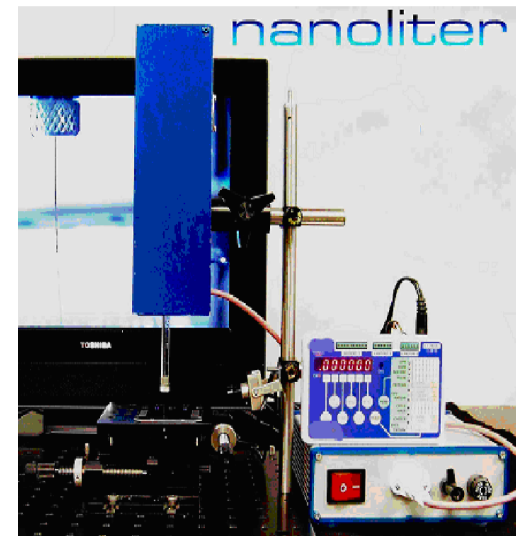
Fast, more screenings, operations per day, more hits, more results.

Non-contact, reduce cross-contamination risk, better data, better quality deposition.

Zero dead volume, no waste, reduced exposure. Very green technology.

Multiple functions, dispensing, SPE, LC other sample introduction techniques.

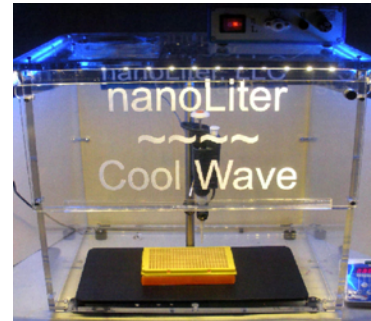
Inexpensive devices, ability to upgrade existing liquid handling instrumentation, less cost, development.



NanoLiter's Patented Cool Wave® Technology

Dispenses and treats liquids across the widest dynamic volumetric, viscosity range at the fastest rate, with the most functionality at the lowest cost/channel of any technology on the planet.

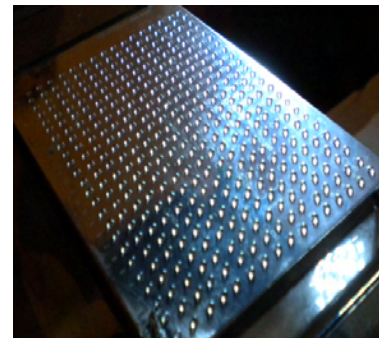
Comes in two flavors: Low and High Tech.



Low Tech: Selling, direct nanoliter syringes and pipettes to labs + expendables.



1 msec !!!



IBF vibrates electric fields that virtually never break with one source of energy.
Competition vibrates matter that breaks frequently with N sources of energy. 100x more expensive, less stable

High Tech: Selling OEM, Cool Wave® IBF technology, R&D to instrument, other firms + expendables.

Target Market: Mass Spectrometry Sample Preparation In Analytical Instrument Industry.*

Analytical Instrument Industry \$50B/yr

Mass Spectrometry instrument market, a subset thereof, \$5-7 B/yr

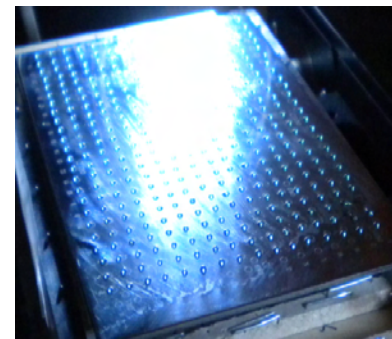
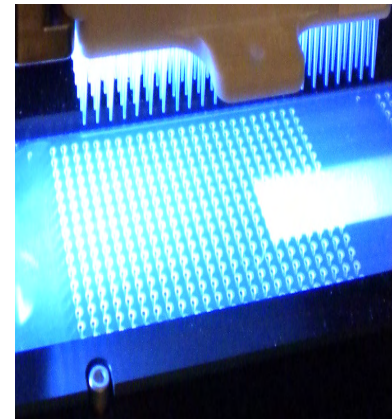
Overall sample preparation market, ca. \$10B/yr

Mass Spectrometry Sample Preparation Market, \$ 0.5- 1.0 B/yr
Growing at 15%/yr.

Applications: MALDI +, DART MS, SIMS sample preparation and
MS sample introduction R&D for proteomics, *iomics and more.

Disease, health biomarker identification, defense, HSL, forensic and
clinical chem as well.

Other high science.



* Instrument News, September 2010, Issue 9 is the source of most business information, plus input of experts.

Competition

There is no direct competition for low end devices now.

Some OEM competition below. IBF still unique with superior cost/performance.

Competition Examples:

Labcyte Echo: dispense only. nLs to pLs, >\$400k cost !!!

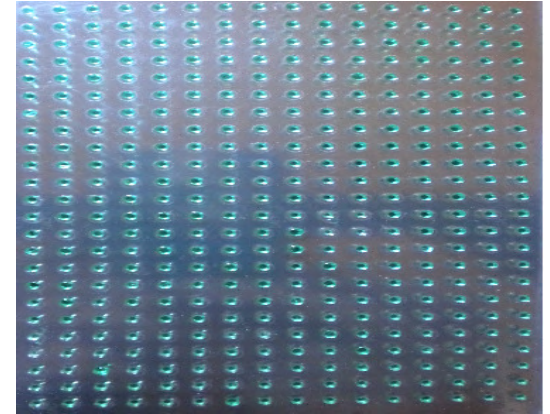
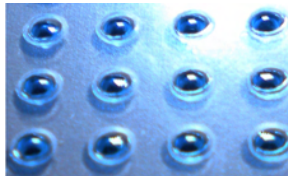
Digilab synQuad: dispense only. High nLs, only 8 channels, primitive tech, \$67k.

Applied Bio: dispense only 3 channels, 4 Hz, electrochemistry degrades sample, \$135k

Nanoliter Cool Wave Lower Cost Examples:

uLs to pLs, multifunctional. Also, adaptable to existing instruments using our low cost hardware, \$5 k. Hundreds, thousands of channels in msec dispense time. Roche 384, robotic device total cost ca. of \$ 30-40k.

Nanoliter Cool Wave + Spark Holland Alias N channel, msec dispense, N channels, cost = \$8-15k.



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NanoLiter's advantages, customers of low tech.

Improve Mass Spectrometry sensitivity 5, 10 to 100x at low cost. MAJOR DEAL !

Wide dynamic volumetric, viscosity range

Dispense from syringe, pipettes, pumps found in every lab in world.

Excellent volumetric precision: < 5.0 μL CV ca. 2-6%, for 5 nL ca. 10%

Excellent spatial precision: ca. $\pm 5\text{-}25 \mu\text{m}$ SD of centroid of dispense max, y and x.



Do new things. Handle viscous liquids. Shoot liquids up!

Very green: Save money on solvents. Reduce exposure and waste costs. Save lab energy using smaller hoods.

Prediction IBF nanoliter Cool Wave technology will be in every one of the 250,000 labs in the world!

NanoLiter's advantages, high tech customers.

Can be retrofit to existing systems at reasonable costs.

Fastest dispense in the world !!!

Widest dynamic volumetric, viscosity range

Poly functional: Dispense, SPE, LC sample introduction, more.

Excellent volumetric precision: < 5.0 μ L CV ca. 2-6%, for 5 nL ca. 10%

Excellent spatial precision: ca. \pm 5-25 μ SD of centroid of dispense max, y and x.

Major increase (5, 10 to 100x) in Mass Spectrometry sensitivity. Most cost effective.

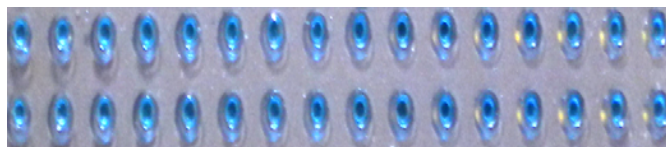
Save \$\$\$\$ using nLs in processes.

Business sweet spot.

Via development/licensing agreements IBF can be added OEM to existing robotic fluidic systems for multiple sales + licenses.



Spark Holland's Alias Dispenser



Nanoliter's customers selected accomplishments

At NIH in the first application there on actual brain cancer samples, a never before PTM was identified as glycosylated tublin, a molecule of cancer!

At University of Washington at St. Louis, M. L. Gross and T. Tu published a 10x increase in MALDI sensitivity for proteins using nanoliter depositions delivered by our first product.

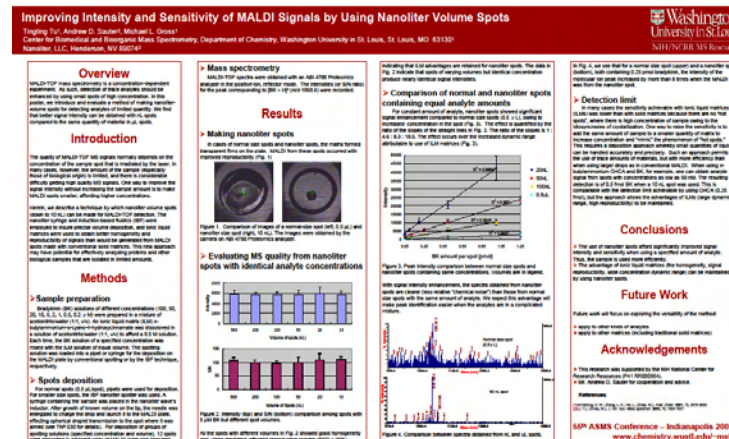
At USF, the ability to detect and better analyze polymers with MALDI was published with up to a 600% increase in signal resulting in more accurate polymer characterization.

At the U of Wisconsin, single cell MALDI was demonstrated using our Nanoliter Cool Wave dispenser. This is huge!

At NIST using our dispenser was used to manipulate viscous liquids. NIST showed a factor of 100 to 1000 increase in the ability to detect the explosive RDX !!!!

At ASMS 2010, JEOL and Nanoliter showed for DART TOF MS that they observed an increase in sensitivity of 10 to 100 x for common drugs and drugs of abuse like cocaine.

Edgewood Arsenal, the USA's core controller of biological and chemical weapons devices and technology, improves ability to handle nerve and other agents, but details are classified.



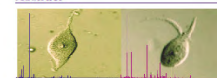
ACR Chemical Neuroscience Article

Mapping Neuropeptide Expression by Mass Spectrometry in Single Dissected Identified Neurons from the Dorsal Ganglion of the Nematode *Caenorhabditis elegans*

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Abstract



We have developed a method for dissecting single neurons from the nematode *Caenorhabditis elegans* in order to determine their peptide content by mass spectrometry (MS). In this paper, we use MALDI-TOF MS and tandem MS to measure and sequence the peptides present in the two neurons, ALA and RID, that comprise the dorsal ganglion. We compare the peptide content determined by MS with the results of immunocytochemistry and *in situ* hybridization of previously isolated peptides AFD, AFS, and six peptides encoded by the *afp-1* transcript. We find complete agreement among the three techniques, which validates single neuron MS as a method for peptide localization. We also discovered and sequenced six novel peptides in the ALA neuron. Cloning of cDNAs and database searching of Genomic Survey Sequences showed that transcript *afp-12* encodes peptide AFD6 (VPSAADMIRFamide) and *afp-13* encodes AFD9 (AEGLSPLIRFamide). AFD4 (DSGLMDIRFamide), AFD5 (DQORIVTETVIRFamide), and three nonstandard peptides (Pept1, Pept2, and Pept3). We have found no similarities with reported peptide expression in the nematode *Caenorhabditis elegans*. This method promises to be ideally suited for determining the peptide content of each of the 298 neurons in the nervous system of this nematode.

Keywords: Neuropeptide, MALDI-TOF, nematode, *Caenorhabditis elegans*, single neuron, *de novo* sequencing

Peptides have long been known to be important intercellular signaling molecules in a wide variety of species. Their role as hormones was established many years ago, yet new peptide hormones continue to be discovered (e.g., kinins (1)). In the nervous system, peptides can act as primary neurotransmitters (2). More commonly, they act as neuromodulators, affecting multiple aspects of neuronal activity. Their effects include modulation of the ion channels involved in action potential propagation and synaptic transmission and modulation of the molecular machinery of transmitter release (3). In most well-studied systems, the number of peptide signaling molecules is impressively large, and as with peptide hormones, new neuropeptides are still being discovered. The details of their activity and sites of action are intricate and particular, so a full description of the role of peptides in a neuronal circuit can be complex, but it must be complete if we are to understand how neuronal circuits work.

The nervous system of the parasitic nematode *Caenorhabditis elegans* contains only 298 neurons (4). This numerical simplicity makes it an attractive system for the study of the role of peptides in neuronal function. We have already shown in *A. nem* that neuropeptides are numerous, widespread, and varied and that they have potent effects on muscle and subsets of neurons (5–9). Most of the peptides we have identified in *A. nem* are FMRFamide-like peptides (FLPs), and are named AF peptides (*Acario* FMRFamide-like precursor proteins). In the related, free-living nematode *Caenorhabditis elegans*, three large families of peptides have been predicted by genome searches or sequenced directly (9–12). FLPs encoded by 34 *flp* genes, NLPs (neuropeptide-like proteins) encoded by 42 *nlp* genes, and insulin-like

Received Date: March 7, 2010
Accepted Date: April 16, 2010

Nanoliter's selected accomplishments

Sold 26 instruments to U's of California, Wisconsin, Illinois(5), Utah, Washington U at St. Louis, USF (2), Duquesne, Georgia Tech, Amgen, Biogen Idex, NIH, NIST, US Army, Utah State, Tetracore, Hitachi and more.

Demonstrated 348 channel nL/uL fastest dispense in the world, 2010.

Demonstrated the world's first pipette/MS with US Army and JEOL, 2010.

3 times nominated, best new instrument @ Pittcon. In group of 20 out of 2000 firms.

R&D, Dev. agreements: Spark Holland; Army; Douglas; MSD Sciex with offer to license.

4 pubs in the peer review literature. 5 pubs in trade papers, and 4 pub. by clients to date.

Collaborating: US Army at Edgewood Arsenal, JEOL, USF, U Wisconsin, Tetracore, etc.

2 US patents (one self won), one CIP & 4 pending patents, one with international options.

Well attended Pittcon course for the last four years on IBF, with international attention.

Numerous write ups in trade papers like Instrument News, Genetic Engineering News, R&D magazine, American Labs and Pittcon.

Nanoliter.com given four/five stars by German Hi Tech IP reviewer.

Scooped low and high level sample handling markets for dispensing, sample preparation worldwide for syringes, pipettes, and pumps.

Nanoliter has excellent rapport with international technical press.

Invited to meet with billionaire David Schwartz (and his lawyers) at Bio-Rad.

Conversations, connections ongoing about technology with most major MS companies



Nanoliter's founders, “partners” and friends.

Founder has developed, applied and promoting mass spectrometry in technology for over 35 years. USA federal GC/MS technology, methods, QC and contracts are based on his papers across most federal USA environmental laws. Implemented tech nationally in the largest chemistry measurement program ever, Superfund. The water you drink today is analyzed by methods, tech he developed at Midwest Research Institute, US gov't and elsewhere, e.g., Los Alamos.

Founder worked as a consultant to most MS firms, six federal govt. agencies, hired sole source as an expert.

Founder: first HTS LC/MS/MS ever used in drug discovery. “Funded” ICP/MS of Houk and LC/MS work of Extrel, PB/LC/MS.

Founder co-invented, patented IBF. Promoted nationally with his son, (EE Santa Clara University), others over the last ten years.

Nanoliter consultants, colleagues includes the most senior MS sales executive for Finnigan and Thermo Fisher, the inventor of PB/LC/MS and patent expert. Two current executives of instrument firms that can not be identified here but who's resumes are available.

Nanoliter has teamed with firm (California) owned by Chief Fluidics Engineer for a subsidiary of \$B Asian firm.

Nanoliter teams with a west coast consumer product firm for production of other unique containment device.

Current, recent collaborations include: JEOL; US Army; Hitachi; U of Wisconsin; Tetracore, USF most customers.

Excellent high level international business, technical and press connections Canada, EU, Asia and across the USA.



Assets

Customers: list of highly probable customers (5 to 25 = \$100 to \$450k)

2 US patents, 1 CIP, 4 pending patents one with international options and the ability to get more inexpensively.

These efforts have captured the future of the syringe, pipette, pump and instrument introduction. They included patent expendables for syringes, pipettes and pumps. (Large \$).

Existing instruments/products.

Hardware, controlling software that dispenses nanoliters on low and high throughput devices in many morphs.

3 high tech flutronics circuits.

250 previously made core circuits in inventory for nL syringe. (Theoretically worth $250 \times \$15-20,000 = \3.5 to 5.0 M)

Excellent web domains: nanoliter.com (up), picoliter.com (up), and parked domains: femtoliter.com and other nanoliterpipette.com and nanolitersyringe.com and others holding.

Credit card purchase set up. LLC in NV established along with other business requirements.

SOPs' for building the devices. Computer drawings for devices.

Purchasing "agreements" with suppliers and related info organized.

Office equipment, device manufacturing and other equipment (Estimated value, \$100k).

Accounts receivables, small cash. No debt.

Path

Without funding.

- Continue to bootstrap.

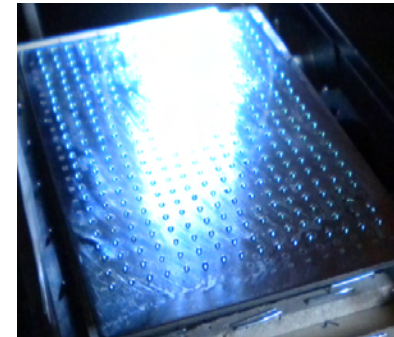
- Market.

- Sell devices nL devices to scientist in R&D.

- Sell tech and IP to fluidic firms, OEM.

- Develop tech, IP, business and Loop

- Continue to acquire IP



With Funding

- immediately increase marketing.

 - advertise in JASMS ½ page color, C&E News, Google and a few web sites.

 - “Re-build” rep network.

 - Rebuild nanoliter and with picoliter.com as link.

- Seek, retain core manager with startup experience.

- Hire secretarial, other manufacturing help in Henderson, NV.

- Open small office, ca. \$1k per month.



Request

Seeking \$ x over y years. For % of company valued at \$ z for series A funding.

Offers first right of refusal for additional equity sales.

Seat on BOD

Dividends.

Preferred series B funding position for movement to clinical, forensic markets & consumer markets.

Summary

Nanoliter offers a unique low and high tech opportunity

30 world class MS and science customers.

Ten year's of IP awarded. Picket fence, +

Can be appended to sophisticated and simple devices.

Potential consumer market potential in series B.

Army clothes that cool. Glue gun. Charged polymers, more.

Plan: sell dispensers direct to MS sample prep R&D. Then license, OEM tech to large firms.

Excellent, world class technical, startup and sales team.

Record on national innovation and implementation.

Seeks funding partner to move to \$ 7/8 figure firm.

Series B funding sought for move into to forensic, clinical and manufacturing/consumer market.



+

