SYNOPSIS · INVENTOR AND TECHNOLOGY DEVELOPER · PUNE, INDIA

Hemant K. Rohera

Inventor, entrepreneur and technology developer. Medical technology, energy technology, patented systems and scientific innovation.

1998	3	2041	9
hands-on research and development since	granted patent families, held by the inventor	term of the eMedica US patent, US 12,226,183 B2	DOI-registered research publications, 2026

WHO I AM

One engineer, three fields, one discipline

I am an independent inventor and engineer based in Pune, carrying out hands-on research and development since 1998 across bioelectronics, energy storage and vehicle power systems.

The thread that runs through all of my work is the same engineering problem seen in three settings: **delivering controlled electrical energy into a system that resists it** — a living cell, a lithium-ion battery, a vehicle's electrical network. Each setting has produced a granted patent family and a company built to develop it.

eMedica is my bioelectronic medical device, developed by Rohera Healthcare & Technology Pvt. Ltd. The **Hybrid Power Pack** pairs a battery with a supercapacitor under switched control, developed by Rohera Emerging Energies Pvt. Ltd. **OMNIA Drive** conditions and routes power from several on-board sources, developed by Rohera Industries (OPC) Pvt. Ltd.

Since 2026 I have been publishing the engineering behind this work openly — a 79-page monograph, two research preprints, six technical notes and the calculation code that reproduces every figure — so that anyone evaluating the technology can check the reasoning for themselves.

VERIFIED IDENTITY

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FIELDS OF WORK

Bioelectronics — therapeutic electrical stimulation devices

Energy storage — hybrid battery–supercapacitor systems

Power electronics — multi-source vehicle power conditioning

CAREER

Three decades, three companies

2020 – present	**Founder, CEO & CTO — Rohera Healthcare & Technology Pvt. Ltd. (eMedica)** Bioelectronic medical device company, Pune. Incorporated 6 October 2020 · CIN U33309PN2020PTC194671
2018 – present	**Founder & CTO — Rohera Emerging Energies Pvt. Ltd. (REEPL)** Hybrid Power Pack energy storage technology · CIN U29308PN2018PTC178170
2018 – present	**Founder — Rohera Industries (OPC) Pvt. Ltd.** OMNIA Drive multi-source vehicle power technology · CIN U73100PN2018OPC174240
2012 – 2019	**Director — Swatantra Power** Pune
1998 – 2012	**Owner — Rohera Enterprises** Pune

EMEDICA · DEVICE RECORD

Regulated and tested

Licence	Class A manufacturing licence (Form MD-5), MFG/MD/2023/000926, issued 20 Oct 2023 by the State Licensing Authority, FDA Maharashtra
Safety	Tested to selected clauses of IEC 60601-1 at a NABL-accredited laboratory (report HPLI/Test/2104001401) — patient leakage 1.3 µA against a 10 µA limit
Use record	Use recorded across 4,651 people at 37 participating institutions, with no serious device-related adverse events reported (company-reported observational use, not a controlled study)
Next	A wearable eMedica device is in development, with fresh clinical evaluation planned

Clinical studies and eMedica publications: **emedica.in**

HYBRID POWER PACK · INDEPENDENT TESTING

Evaluated at two national laboratories

CIRT Pune	Report B34000, 20 Mar 2020, model HPP35A — life-cycle test, 10,000 cycles at 60 °C
DRDO R&DE(E)	Environmental test report 020623ESG/ETF, 21 Jun 2023 — discharge at +70 °C, sustained 450 A

Independently tested at CIRT Pune (10,000 cycles at 60 °C) and by DRDO R&DE(E) (+70 °C, sustained 450 A). Both are single-configuration environmental and endurance evaluations, not comparative benchmarks.

INTELLECTUAL PROPERTY

Three granted patent families

Every grant below is held by the inventor in his own name. Each family is listed by jurisdiction so that every entry can be looked up on the public register of the office that issued it.

Medical therapeutic device

eMedica · PCT/IB2020/055292 · priority 10 Sep 2019

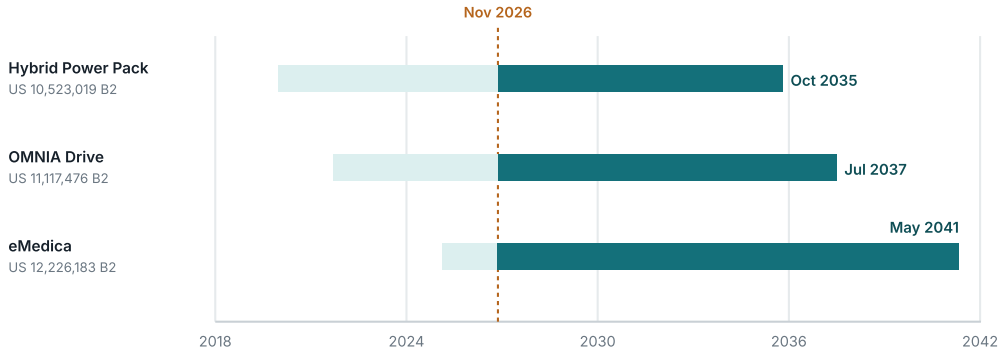
A bioelectronic therapeutic device that delivers controlled electrical stimulation to the body. The US grant carries twenty claims under a single independent claim. Patents granted in the United States, Japan, Korea, Australia, Canada, Saudi Arabia and South Africa, including US 12,226,183 B2.

JURISDICTION	NUMBER	STATUS
United States	US 12,226,183 B2	Granted 18 Feb 2025 · term to 5 May 2041
Japan	JP 7611901 B2	Granted 26 Dec 2024
Republic of Korea	KR 10-2954775	Granted 15 Apr 2026
Australia	AU 2020346420 B2	Granted 2 Apr 2026
Canada	CA 3150348	Granted 7 Oct 2025
Saudi Arabia	SA 18122	Granted 23 Oct 2024
South Africa	ZA 2022/04073 B	Granted 25 Jan 2023
New Zealand	NZ 787102	Accepted 25 Sep 2026
Europe · India · Singapore · UAE	EP 4041064 · applications	Applications pending

PORTFOLIO AT A GLANCE

Remaining term of the three US grants

All three families are granted in the United States and Japan. Light segment: grant to today; dark segment: term remaining from November 2026, subject to maintenance fees.



Hybrid Power Pack

REEPL · PCT/IB2015/056108 · priority 10 Jul 2015

A battery and a supercapacitor under switched control. The battery charges and discharges through two separate unidirectional switches; the supercapacitor connects through a bidirectional switch, giving it a charging path of its own; a controller supplies sustained DC power from either store, or from both simultaneously.

JURISDICTION	NUMBER	STATUS
India	IN 301517	Granted 27 Sep 2018
United States	US 10,523,019 B2	Granted 31 Dec 2019 · term to 17 Oct 2035
Europe (validated DE, GB, CH)	EP 3 320 595 B1	Granted 19 Jan 2022
Japan	JP 6644883 B2	Granted 12 Feb 2020
Canada	CA 2,991,527 C	Granted 28 Feb 2023
Eurasian Patent Office	EA 035682 B1	Granted 24 Jul 2020
United Arab Emirates	UAE 4059	Granted 28 Nov 2021
Viet Nam	VN 0040455	Granted 2024
Mexico	MX 377263 B	Granted 7 Mar 2025

OMNIA Drive — multi-source vehicle power

Rohera Industries · PCT/IB2016/055563 · priority 25 Sep 2015

A power processing unit that conditions several on-board energy sources and routes traction power against a state-of-charge threshold — charging the energy store and driving the motor at the same time.

JURISDICTION	NUMBER	STATUS
United States	US 11,117,476 B2	Granted 14 Sep 2021 · term to 2 Jul 2037
Japan	JP 7,109,623	Registered 21 Jul 2022
India	IN 477613	Granted 6 Dec 2023

PUBLICATIONS AND SCIENTIFIC PAPERS

The engineering, published openly

All deposits are on Zenodo, CERN's open research repository, under CC BY 4.0 with the author's ORCID attached. Every figure in the research papers can be regenerated from the published calculation code.

RESEARCH MONOGRAPH AND PREPRINTS · HYBRID POWER PACK

Two Stores, One Power Pack — consolidated monograph
79 pages, 144 references. The full engineering case for pairing a battery with a supercapacitor: physics, switching, battery management, sizing, applications and safety.

MONOGRAPH · 29 SEP 2026
10.5281/zenodo.23021958

Two Stores, One Power Pack
Research paper on hybrid battery–supercapacitor architecture, from cranking to traction duty cycles.

PREPRINT · 25 SEP 2026
10.5281/zenodo.22958077

The Hybrid Power Pack as a Platform: balancing, protection and multi-source charging
A claim-by-claim engineering reading of US 10,523,019 B2.

PREPRINT · 27 SEP 2026
10.5281/zenodo.22987200

Calculation scripts and working data for both papers
Open-source software (MIT licence), version 1.1, that reproduces every figure and result.

SOFTWARE · 27 SEP 2026
10.5281/zenodo.22991760

In peer review: three manuscripts from this programme are currently under review at *Journal of Energy Storage*, *Batteries* and *Energies*.

TECHNICAL NOTES · 11 SEP 2026

SUBJECT	DOI
The four-layer rule	10.5281/zenodo.22700035
A three-way test for on-board energy harvesting	10.5281/zenodo.22700047
State of charge versus depth of discharge	10.5281/zenodo.22700050
The engineering problems of hybrid energy storage	10.5281/zenodo.22700056
CO_2 utilisation pathways	10.5281/zenodo.22700061
Harvesting the Earth's magnetic field — the physical limits	10.5281/zenodo.22700063

SCIENTIFIC ARTICLES AND LONG-FORM WRITING

The Electrical Body
Scientific essay on cellular bioelectricity, the foundation of eMedica's field.

ARTICLE · 11 SEP 2026
hemantrohera.com

Engineering explainers on hemantrohera.com
The charge asymmetry · Why a capacitor extends cell life · Where the energy comes from · State of charge as a switch · How to read a test report

WEB ARTICLES · 2026
hemantrohera.com

Science & Energy Notes
The author's LinkedIn newsletter on energy science and engineering.

NEWSLETTER
linkedin.com

SCIENTIFIC CONTRIBUTIONS

Three ideas the published work puts on the record

Each is derived from first principles and cited to peer-reviewed literature, with every number labelled as measured, derived, from the literature, or a design estimate.

ELECTROCHEMISTRY

The charge asymmetry

$0.20\ \text{V} \rightarrow 0\ \text{V}$

Graphite stores lithium only 50–200 mV above the potential at which metallic lithium plates. A fast **charge** pulse — regenerative braking, a solar edge — pushes the electrode toward that boundary; discharge moves it away.

So the transient that most needs absorbing is a charge transient. A supercapacitor branch with its own charging path, as claimed in US 10,523,019 B2, is built to take exactly that.

Literature: Chen et al. 2025, *ACS Electrochemistry* 1(5), 574–587.

POWER ELECTRONICS

Heat follows the form factor

$\Delta Q = 1 - 1/FF^2$

The resistive heat a buffer removes from a battery is set by the form factor of the load current — rms divided by mean — not by how far the peak is cut. A peak-current ratio overstates the benefit.

Applied to the standard WLTC drive cycle (FF 2.123) the ideal reduction is 77.8 %; for a 400 A, one-second cranking pulse once a minute it is 98 %.

DERIVED Ideal reductions from stated waveforms — published with the code that computes them.

VEHICLE ENERGY

A sign test for harvesting

$C_p \leq 16/27$

Every on-board energy source falls into one of three classes: **external** (sunlight), **recovered** (regenerative braking) or **parasitic** (a turbine in the vehicle's own airstream).

The class fixes the sign of the energy balance before any hardware is built — the discipline behind OMNIA Drive's state-of-charge-aware multi-source control.

Literature: Betz 1920, the limit on extractable wind power.

WORKING PRINCIPLE

Science first, then the product

Every claim in this body of work carries its conditions and its evidence status. Patents are stated jurisdiction by jurisdiction, so that each can be checked on a public register; laboratory results are stated with the configuration that was tested; and every derived figure is published with the code that produced it.

That standard is what makes the technology licensable: an engineer evaluating it can verify each step rather than take it on trust.

FOR LICENSING, PARTNERSHIP AND RESEARCH ENQUIRIES

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