

# Patent Owner Caltech's Oral Argument May 8, 2018

Apple, Inc. v. California Institute of Technology.  
Case No. IPR2017-00701

# Instituted Grounds: Pat. No. 7,421,032

---

## IPR2017-00700

Ground	Claims	Basis	Prior Art
1	11, 12, 14-16	103	Ping, MacKay, Divsalar
2	13	103	Ping, MacKay, Divsalar, Luby97

## IPR2017-00701

Ground	Claims	Basis	Prior Art
1	1, 4-10	103	Ping, MacKay, Divsalar, Luby97

## IPR2017-00728

Ground	Claims	Basis	Prior Art
1	18-23	103	Ping, MacKay, Divsalar, Luby97

# Caltech's Groundbreaking Invention

# IRA codes solved a decades-old problem

- ▶ Gallager introduced LDPC codes in 1963, but they required complex quadratic encoding that prevented their adoption for decades. (MM ¶¶181-182, 194.)

range of trade-offs between performance and decoding complexity. One major criticism concerning LDPC codes has been their apparent high *encoding* complexity. Whereas turbo codes can be encoded in linear time, a straightforward encoder implementation for a LDPC code has complexity quadratic in the block length. Several authors have addressed this issue:

Richardson 2001 (EX2011) at 2 (emphasis added)

While semiconductor technology has progressed to an extent where the implementation of LDPC codes has become possible, many practical issues still remain. First and foremost, there is a need to reduce complexity without sacrificing performance.

Kim 2006 (EX2010) at 1 (emphasis added)

# IRA codes solved a decades-old problem

186. Despite the fact that LDPC codes had been known in the art since the 1960s, prior to the invention of IRA codes no one in the art had devised a way to achieve near-Shannon limit communications with low complexity encoding and decoding. Use of LDPC codes had been particularly hindered by encoding complexity that discouraged their use in practical applications.

187. The invention of IRA codes provided a solution to the long-standing shortcomings of LDPC codes and error correcting codes in general. IRA codes allow near-Shannon limit communications with low complexity encoding and decoding. As a result, the IRA codes, encoders, decoders, and methods disclosed and claimed in the '032 patent have been widely praised by the industry.

MM ¶¶ 186, 187

# Explore Litigation Insights

Docket Alarm provides insights to develop a more informed litigation strategy and the peace of mind of knowing you're on top of things.

## Real-Time Litigation Alerts



Keep your litigation team up-to-date with **real-time alerts** and advanced team management tools built for the enterprise, all while greatly reducing PACER spend.

Our comprehensive service means we can handle Federal, State, and Administrative courts across the country.

## Advanced Docket Research



With over 230 million records, Docket Alarm's cloud-native docket research platform finds what other services can't. Coverage includes Federal, State, plus PTAB, TTAB, ITC and NLRB decisions, all in one place.

Identify arguments that have been successful in the past with full text, pinpoint searching. Link to case law cited within any court document via Fastcase.

## Analytics At Your Fingertips



Learn what happened the last time a particular judge, opposing counsel or company faced cases similar to yours.

Advanced out-of-the-box PTAB and TTAB analytics are always at your fingertips.

## API

Docket Alarm offers a powerful API (application programming interface) to developers that want to integrate case filings into their apps.

## LAW FIRMS

Build custom dashboards for your attorneys and clients with live data direct from the court.

Automate many repetitive legal tasks like conflict checks, document management, and marketing.

## FINANCIAL INSTITUTIONS

Litigation and bankruptcy checks for companies and debtors.

## E-DISCOVERY AND LEGAL VENDORS

Sync your system to PACER to automate legal marketing.